It's PRECIOUS LIQUOR *to Jim Lester*

THERE'S more to Jim Lester's job in Mathieson's plant at Saltville, Virginia, than just filling liquid caustic tank cars. His is the task not only to see that cars are properly filled, but to make sure that each car interior is clean and free from defects before filling, that pipe lines, valves, pumps are all in perfect condition. On him rests a goodly share of the responsibility for the uniform purity of Mathieson Liquid Caustic when it arrives at your plant.

One reason Jim Lester carries this responsibility so well is his frank respect for the quality of Mathieson Caustic. Throughout the eleven years he has worked at Saltville, this man has watched his company steadily improve its processes, has seen it lead time and again in producing caustic which set new standards for purity and uniformity. With such a background, it is no wonder Jim Lester regards the product in his care as "precious liquor"—no wonder that, like all of the men behind Mathieson Chemicals, he spares no pains to deliver you a dependable product of uniform, outstanding purity.

The MATHIESON ALKALI WORKS (Inc.)
60 East 42nd Street New York, N. Y.

Send for free 72-page book, "Cutting Costs with Liquid Caustic Soda."

Mathieson Chemicals

SODA ASH...CAUSTIC SODA... BICARBONATE OF SODA . . . LIQUID CHLORINE...BLEACHING POWDER... HTH AND HTH-15...AMMONIA, ANHYDROUS AND AQUA...PH-PLUS (FUSED ALKALI) . . . SULPHUR CHLORIDE . . . CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE)

THE PAPER INDUSTRY

MARCH, 1937
Vol. 18—No. 12

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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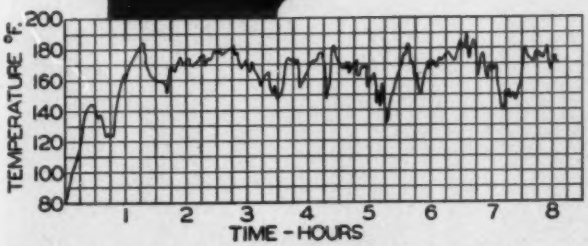
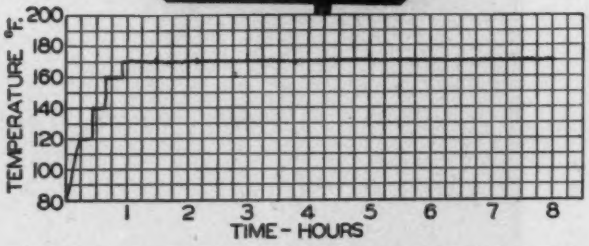
HAND *or* AUTOMATIC CONTROL

of Grinding Temperatures



With Hand Control—Note 50—60° F. changes in grinding temperatures and the rapid fluctuations. *You* translate them into effect on quality and conversion costs.



With Taylor Automatic Control—Grinding temperature is held within an average of plus or minus 1° F. It is easy also to bring stone temperature up gradually after a shutdown.

Read the charts for a conclusive answer—and use Taylor Automatic Control

NOTE on one chart the *wide* fluctuations in grinding temperatures—50—60° F. in a short time. This is a record of hand control. What will be the effect on stock quality—on freeness, color, tensile strength? Certainly there will not be a uniform quality.

Just as important to you is the bad effect of such hand control on your production, your power consumption, the life of your stones.

You see the reverse of this chart picture in the uniform, even, automatic control of grinding temperature by a Taylor System.

Production increases as temperature increases. Taylor Control maintains the grinding temperature within such narrow limits that you can operate close to critical temperatures of both stock and stone. Maximum production is always possible without danger to stock quality or to stone.

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Stone wear decreases with uniform temperature control. Sudden fluctuations cause shelling and blistering, Taylor Control reduces reburrings . . . brings stone temperatures up gradually to prevent fracturing.

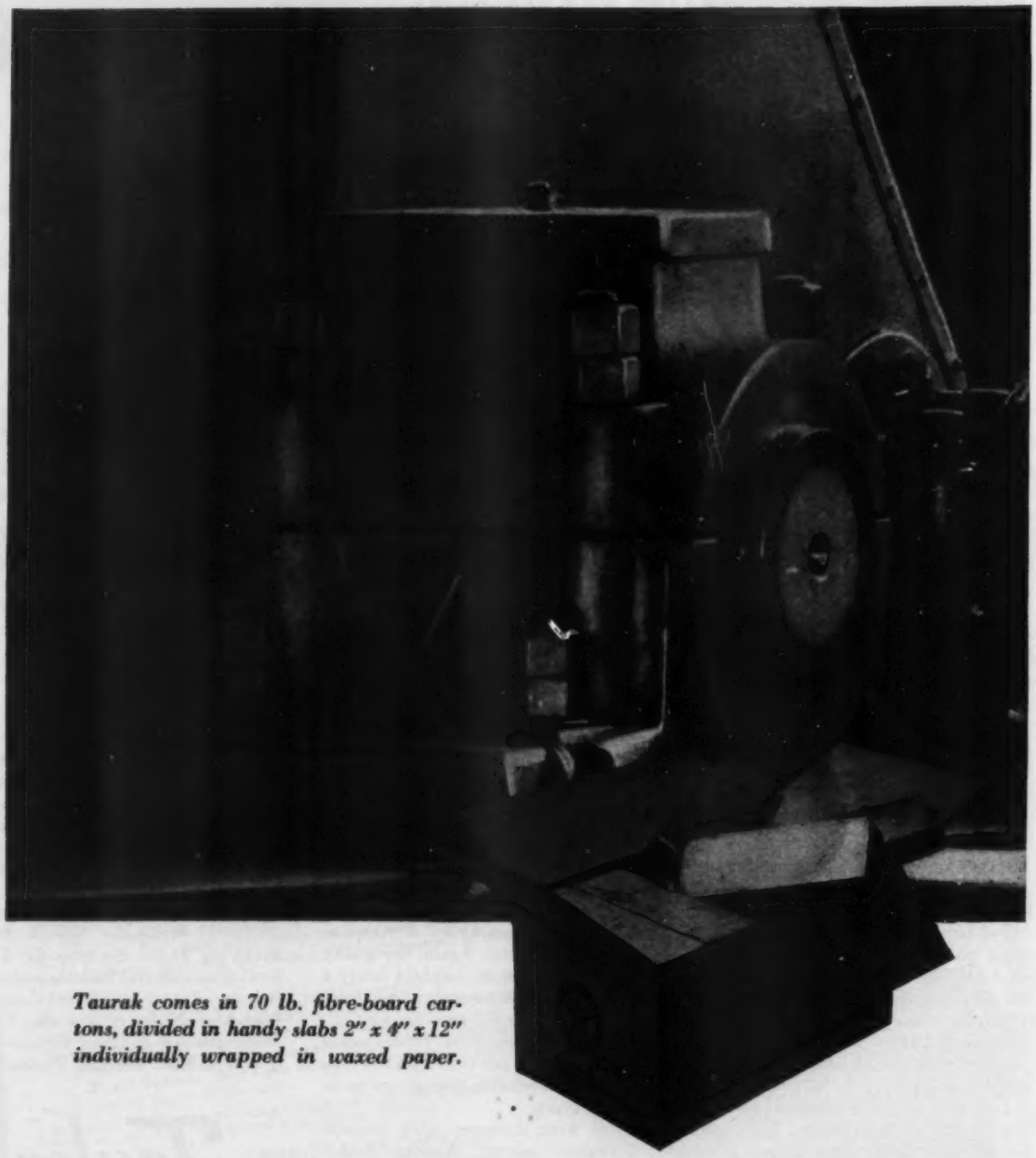
Many mills in the United States and Canada have experienced the savings and improved product quality from using a Taylor System of Grinder Temperature Control. This system is a development of the first practical method of measuring grinder temperatures worked out by Taylor Engineers several years ago. Learn how Taylor Automatic Control today can greatly increase operating efficiency. Write for Special Bulletin 98108 on Taylor Systems for Pocket, Semi-magazine and Full Magazine Type Grinders. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada, Manufacturers in Great Britain—Short & Mason, Ltd., London, England.

Taylor

Indicating Recording • Controlling

TEMPERATURE, PRESSURE *and* FLOW INSTRUMENTS

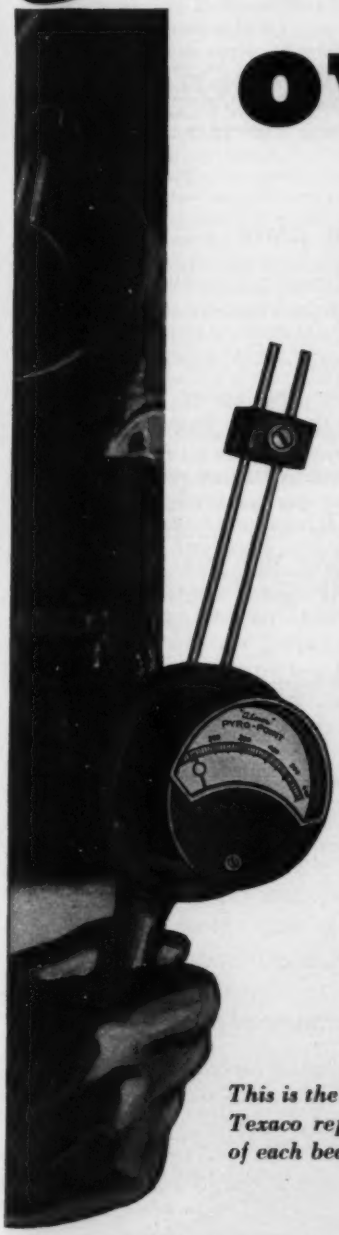
This



Taurak comes in 70 lb. fibre-board cartons, divided in handy slabs 2" x 4" x 12" individually wrapped in waxed paper.

TEXACO

Stops overheating



IT'S SOLVED. We mean the game of guessing just *why* one open-type bearing persists in overheating, while another runs cool. Research engineers in Texaco laboratories have definitely proved that the skin temperatures of a bearing must be known before a grease-type lubricant can be satisfactorily specified.

Today, Texaco men take pyrometric readings of each bearing so that the exact grade of Texaco Taurak can be ascertained.

Selected in this scientific way, Taurak eliminates overheating. It doesn't "drag out" of the bearing and waste away. It doesn't "glaze over" and fail to lubricate.

Try Taurak in bearings subjected to high external heat. You'll thank us for this tip.

A Texaco representative will gladly provide practical engineering service to prove the economies of Texaco Products.

THE TEXAS COMPANY · 135 East 42nd Street, New York City

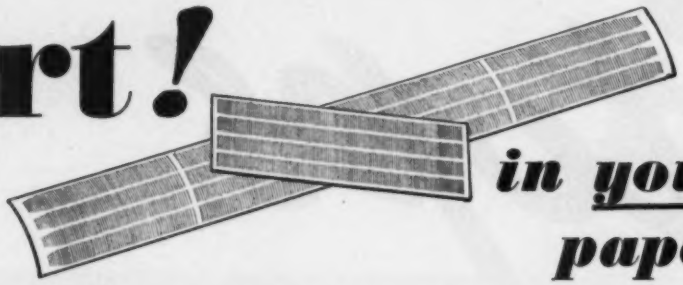
Nation-wide distribution facilities assure prompt delivery

This is the "pyro-point" instrument with which the Texaco representative learns the skin temperature of each bearing before specifying Taurak.

TEXACO

Industrial Lubricants

Dirt!



in your paper?

Clean paper can be made only with the essential aid of the most efficient screening operations. Too wide slots, forced velocity, partially clogged screens and short useful screen plate life . . . . these are productive of low quality, high cost and dissatisfaction.

CRODON
The Chrome Plate

Let us tell you how to cure these ills with chromium plate . . . . . .

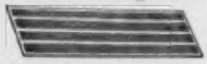
Worn, rough and inaccurate slots result from normal wear of ordinary plates. CRODON provides a permanently hard, durable protection against corrosion. Fine precision of slot dimensions is accurately maintained.

Fine slot sizes are possible with CRODON: not only is cleaner, finer paper obtained, but it is unnecessary, in order to maintain full production, to force velocity and increase dirt count. Scientific co-ordination of slot sizes can be arranged and kept permanent, thus introducing long fibres minus dirt. The added slot smoothness more easily passes screened stock without slowing up production. Clogging (which often reduces capacity 50% or more) is practically eliminated.

CRODON-plated screen plates attain long useful life. The unduly prolonged use of inefficient screens is no concern of mills which have installed chromium-plated plates—they're making cleaner and better paper at lower screening costs than ever before.

The realization of worth-while economies, establishment of new and enviable performance records and trouble-free operation materializes with the aid of CRODON. These attainments have been proved by practical experience of regular paper-making operations. CRODON-plated screens offer outstanding improvements over ordinary plates, whether flat or curved types.

Check up on your screening operations . . .



Let us send you our Bulletin No. 9 to more fully acquaint you with CRODON-plated screen plates.

Other outstanding successful applications in the paper industry are on press rolls, suction box covers, drying drums and embossing rolls. These and other specific applications are fully described in bulletins which will be furnished upon request.

The trade-mark CRODON assures the best in chromium plate

Most mills appreciate the importance of utilizing a reputable chromium plating service such as CRODON typifies, and which is recognized as a standard specification for the maximum in quality: dependability with resultant cost reductions; and improved operating efficiency.

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5-R DRIVES BEATERS AND JORDANS AT 25% TO 50% LOWER TENSION!

HERE are the reasons why you should immediately investigate the remarkable new Goodyear 5-R Belt—the only square-edged flat fabric transmission belt in the world with a PERMANENT minimum ratio of tension, or "R," of 5:

HIGHEST COEFFICIENT OF FRICTION—*a tenacious pulley-grip unsurpassed in any other type of belt!*

PERMANENT FACE ADHESION — *5-R is distinctive for the permanence of its adhesion value. 5-R surface will not crumble, ball up or chatter. High face adhesion may be obtained temporarily on ordinary belts by recourse to belt dressing or use of rosinous compounds.*

OPERATES AT SLACK TENSION — *approximately 25% to 50% less tension than other belts; greatly lessens strain on both belt and fasteners with corresponding increase in belt life!*

REDUCES BEARING PRESSURES—*lengthens bearing life, lessens lubrication problems, lowers frictional losses and cuts power costs.*

The G. T. M.—Goodyear Technical Man—will be glad to explain how 5-R's unequaled efficiency and economy will save money on any drive in your plant. To bring him, write Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.

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100 LBS. effective tension
SLACK SIDE TENSION
Ordinary Rubber Belt —100 lbs.
Goodyear 5-R Belt—25 lbs.
TIGHT SIDE TENSION
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Goodyear 5-R Belt—125 lbs.
The new Goodyear 5-R Belt is made in roll lots in all sizes and widths; easily applied with any standard fastener.

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IN RUBBER
GOODYEAR

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BRIGHTENS 95% TO 97%

produces a coated paper
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SINGLE REDUCTION—TOP DRIVE

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BWH

MECHANICAL RUBBER GOODS

BWH *means* "BUI

BOSTON WOVEN HOSE A

L WITH HONOR"

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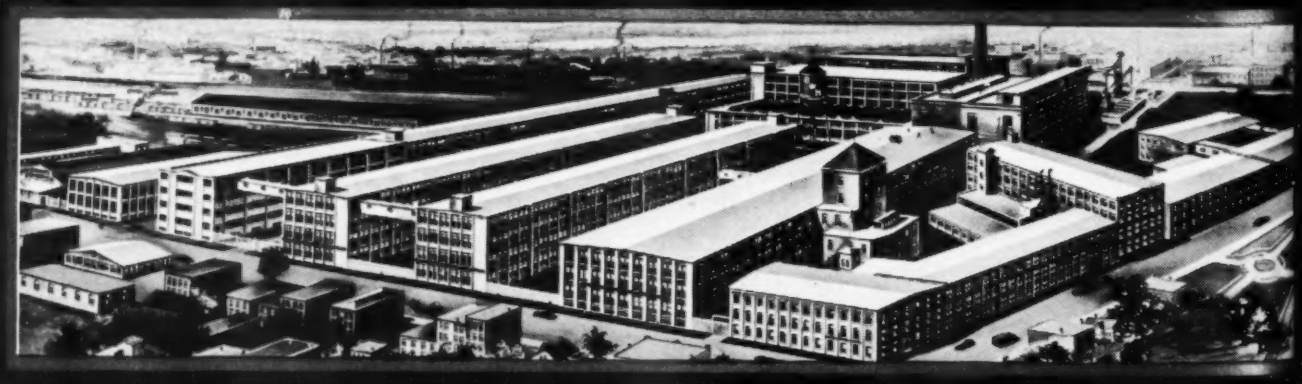

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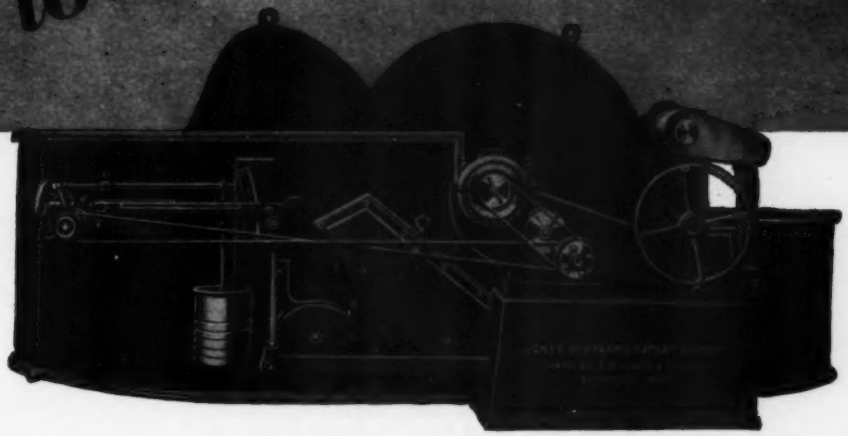

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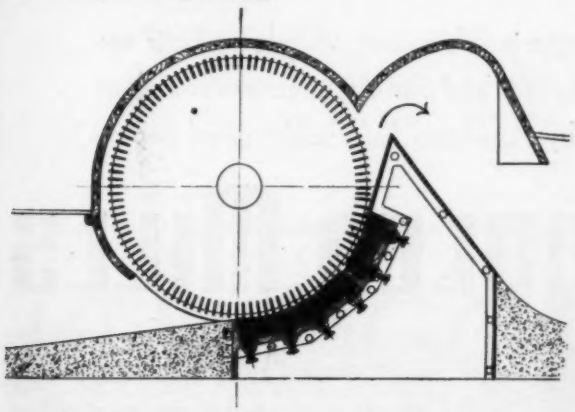

Section showing method of bedplate adjustment

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APPLETON WOOLEN MILLS

Appleton Wisconsin

4 of 7

KELLOGG MASTERWELD TUMBLING DIGESTERS

for Pacific Coast Paper Mills

■ Kellogg "Masterweld" ("THRUSHAFT")* tumbling digesters, 10 ft. 1 in. O. D. x 26 ft. 0 in. and 22 ft. 6 in. over all 1½ in. thick fabricated according to the A. S. M. E. code from Kellogg analysis killed steel.

■ The ("THRUSHAFT")* design eliminates excessive stresses and consequent rapid corrosion in the shell of the digester adjacent to the trunnion pads. The rigidity of this construction also maintains the trunnions and gears in perfect alignment.

■ These digesters are further evidence of the ability of the Kellogg organization to fabricate special equipment to meet present-day demands of the process industries.

* Patent applied for

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SIZING VARNISH and other
SPECIAL SIZING and
WATERPROOFING MATERIALS
ROSIN (Gum and Wood)
SATIN WHITE
CALCIUM ALUMINATE
SODIUM ALUMINATE
CASEIN
CASEIN SOLVENTS
SULPHONATED OILS
SULPHONATED TALLOWS
ALUMINUM SULPHATE (Alum)
IRON FREE ALUM
SILICATE OF SODA
PAPER FILLERS
FOAM KILLERS
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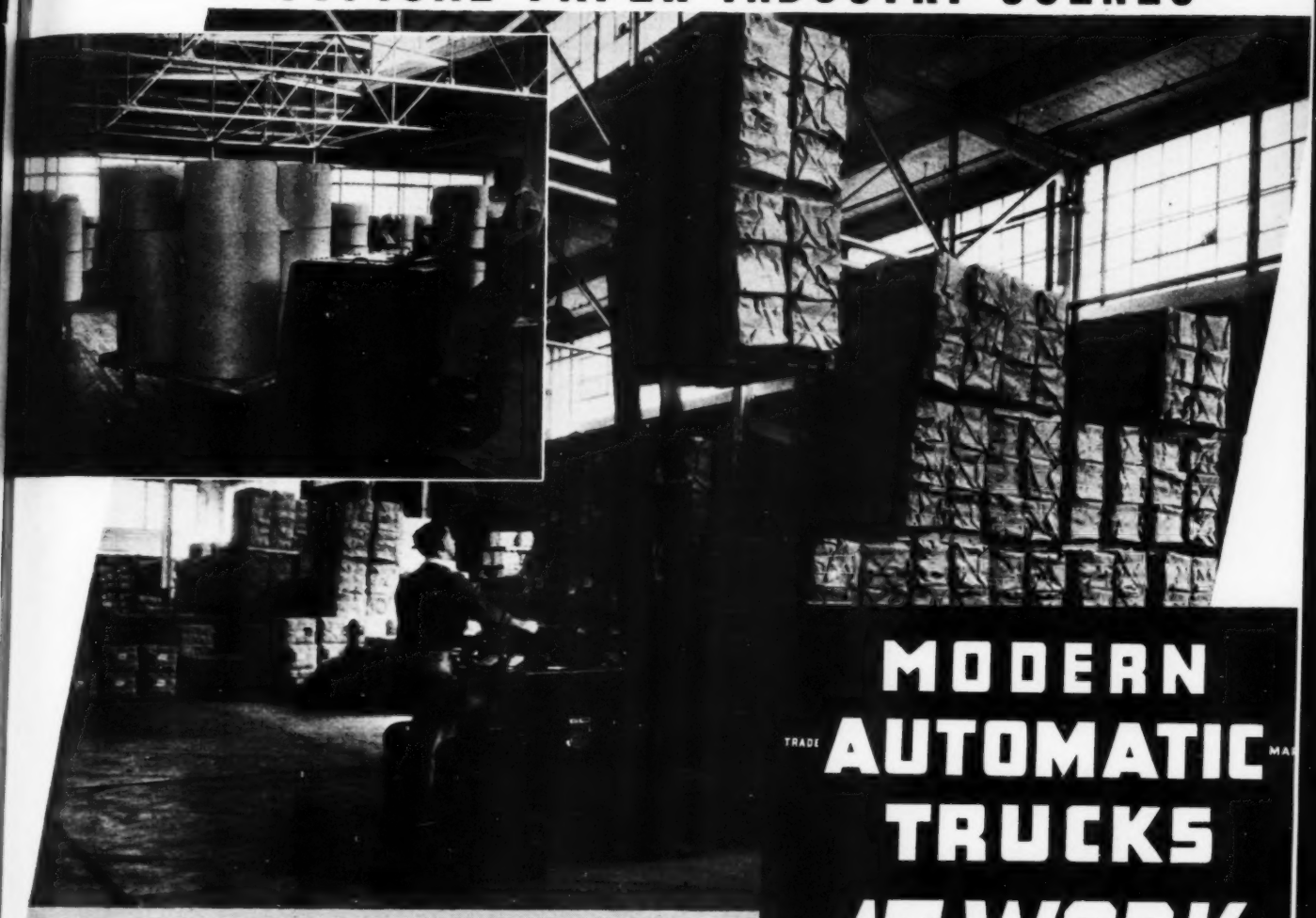
HERCULES POWDER COMPANY
INCORPORATED

Paper Makers Chemical Division

Kalamazoo, Michigan

PM-48

TYPICAL PAPER INDUSTRY SCENES



MODERN AUTOMATIC TRUCKS AT WORK

SAVING MORE MONEY
TIME . . . SPACE . . . ENERGY

In practically every industry today you will find scenes resembling these where new modern "Automatic" Trucks are installed in new factories and in old. They are daily reducing costs in the performance of modern materials handling. They are doing this work in greater volume, safer, more efficiently — mechanically — electrically.

If you are still using old industrial trucks or obsolete methods, now is the time to consider New "Automatic" Trucks built to meet the demands of high speed production. They are your assurance of improved methods, increased efficiency in operation and greater economy in material handling. Built in capacities from one to thirty ton, they offer you a wide capacity range to meet every material handling requirement.

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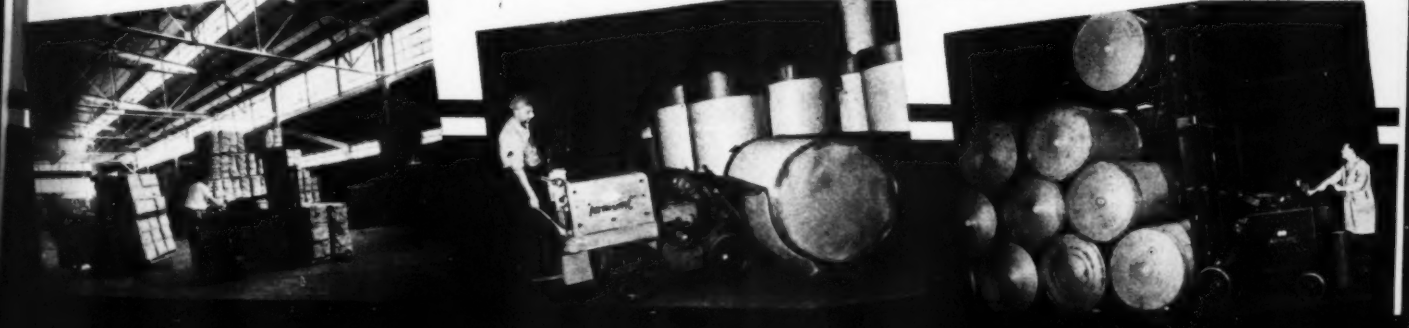
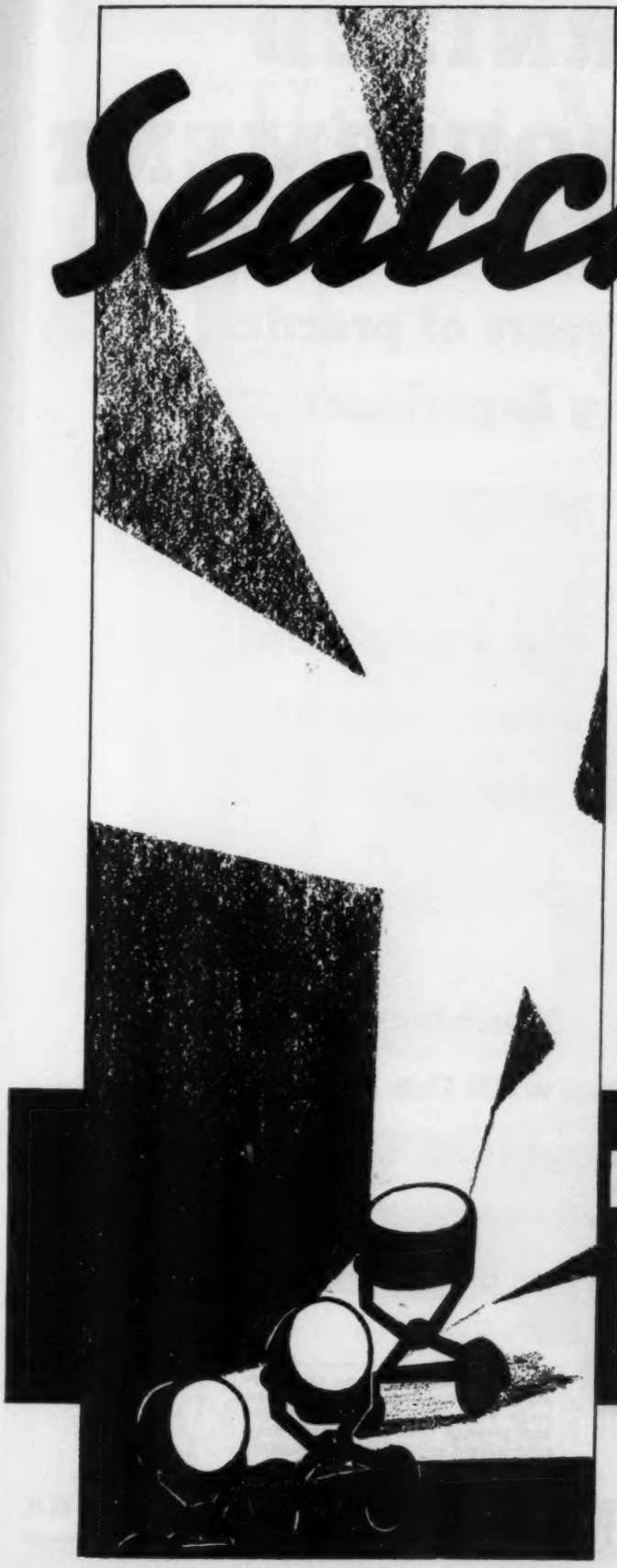


"Our Ambition is to grow Wool fine enough for a Kenwood Felt!"

KENWOOD WOOL PRODUCTS

F. C. HUYCK & SONS – KENWOOD MILLS, ALBANY, N. Y.

Searching



Eager to discover, beams of giant searchlights finger their way through the inky blackness.

Black-Clawson and Shartle Brothers also search . . . for new and better paper making machinery.

The development of the new type forming vat, vertical dryers and the latest in stock pulping, cleaning and refining equipment is proof of this organization's constant regard for the future.

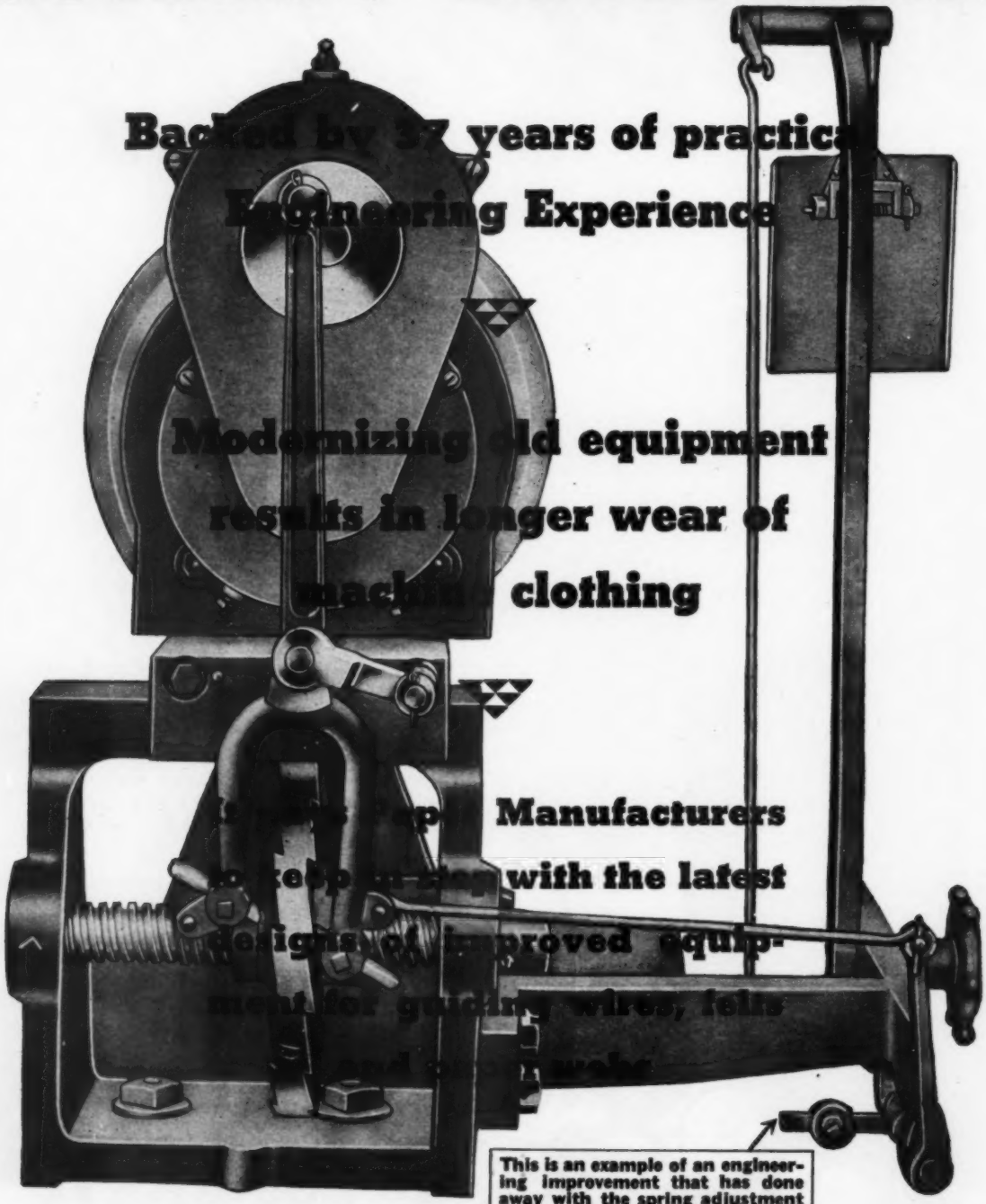
BLACK-CLAWSON and SHARTLE BROS.

MODERNIZED GUIDING EQUIPMENT

Backed by 37 years of practical Engineering Experience

Modernizing old equipment results in longer wear of machine clothing

Manufacturers to keep up-to-date with the latest designs of improved equipment for guiding wires, felts and webs



This is an example of an engineering improvement that has done away with the spring adjustment and given a constant counterbalance weight adjustment for guiding

GILBERT & NASH CO. MENASHA WISCONSIN

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It is Socony-Vacuum's job...through its Engineering Service... to provide 'Correct Lubrication' for 500,000 different applications of bearings...gears...cylinders."

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2. MORE CONTINUOUS PRODUCTION
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4. LOWER LUBRICATION COSTS

= CORRECT LUBRICATION

3 Experience in dealing with individual operating conditions... correction of out-dated practices often resulting in excessive repair and replacement costs.

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THE ORIGINAL LONGCRIMP FOURDRINIER WIRES that have maintained their reputation for long life since 1922.

MODIFIED LONGCRIMP, with the extra wearing quality of Longcrimp. In addition, their peculiar construction gives them a surface so smooth that paper as light weight as tissue is being made on them.

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Open your Crane Catalog, and you open the world's greatest reference book on valves and fittings. There is nothing like it, anywhere else. The line it features is more complete, more comprehensive and more readily available throughout the country than any other.

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Your Crane No. 52 Catalog gives the answer, tested in the laboratory and proved on the job, to most of your valve problems. Look into it for the details regarding 38,000 items. Use it whenever you need valves, fittings, pipe or accessories. CranEquip for satisfaction.

SAVE EXPENSE OF SAVING EXPENSE

SAN FRANCISCO, Feb. 16—Losing steam, water or process liquids in a pulp mill or paper plant by leakage of valves or fittings soon runs into big expense. To keep a close watch on the labyrinth of piping and the myriad valves and fittings in a plant is also expensive.

The easy way to save this expense of preventing expensive losses by leakage is to CranEquip throughout. The dependability which Crane builds into every valve and fitting which bears its name is nowhere more valuable than in pulp and paper plants where continuous operation is so important.

You will find Crane valves dependable whether they are in constant use or must stand by for long periods between operation. They are tight and stay tight. They are so accurately made and carefully finished that they can be removed and installed elsewhere without trouble. Maintenance stocks can be kept at a minimum even in isolated locations.

The Valves You Need

Whether you need brass-trimmed or all-iron globe, angle or cross valves, check valves, or valves of metals that will not corrode under your more exacting services, you can get what you need from Crane. Your Crane No. 52 Catalog will give you the details of design, construction and dimensions. Use it for easy ordering. A nearby Crane branch or distributor will give you quick service. Begin to CranEquip your mill now. That is the road to satisfactory piping.

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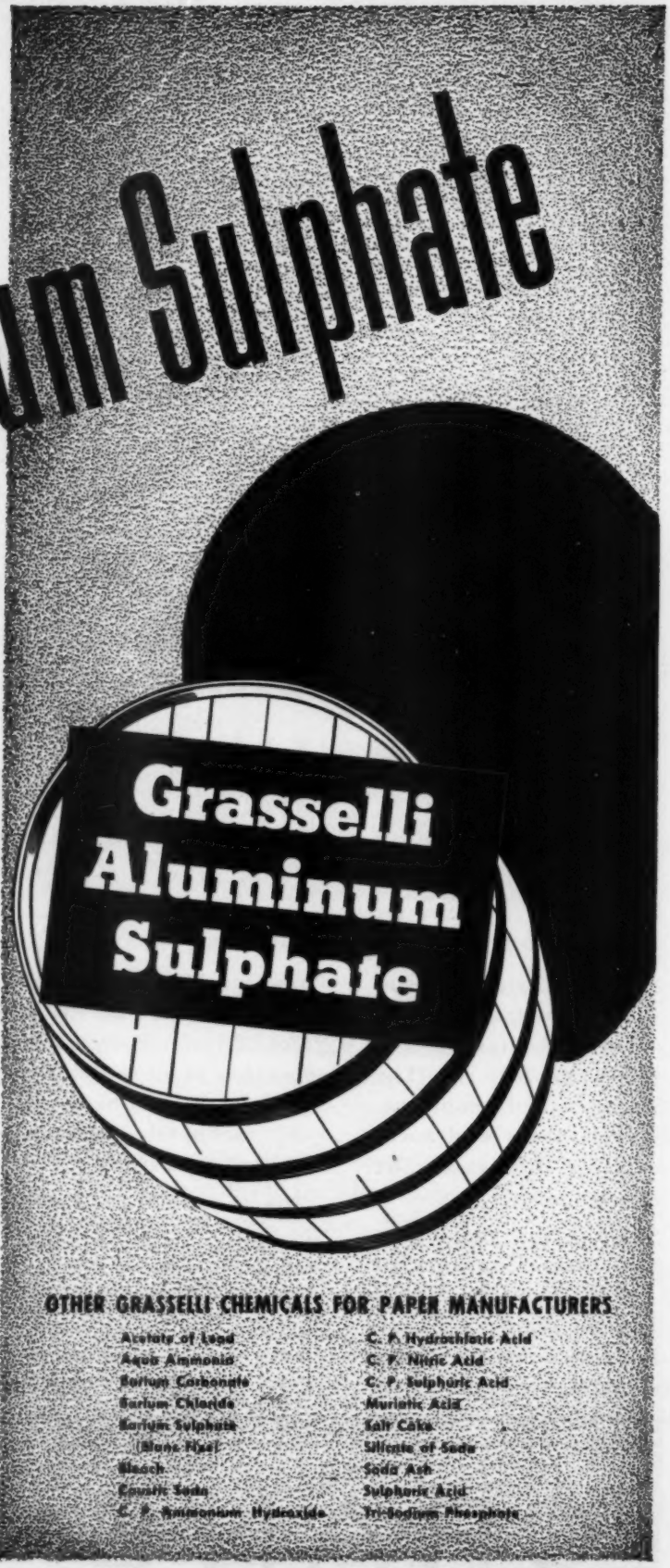

● GRASSELLI Aluminum Sulphate is a *paper makers'* Alum that's made expressly for exacting paper makers . . . it is manufactured especially to meet the critical requirements of the producers of high grade papers.

Grasselli Iron Free Aluminum Sulphate always wins the approval of paper mills where *QUALITY* is the watchword. It is always uniform in its chemical and physical properties. Lump and Granulated—shipped in barrels containing approximately 400 lbs. and in bags containing 200 lbs.

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GOULDS PUMPS set new standard

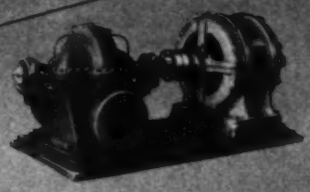
For paper stock in consistencies up to 6%, Goulds Fig. 3105 is the finest Centrifugal Paper Stock Pump built today.

for

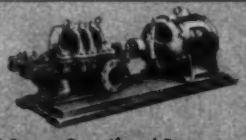
PERFORMANCE *and* ECONOMY

For miscellaneous pumping in paper and pulp mills and converter plants, Goulds Close Coupled Centrifugal Pumps render extremely efficient, low cost service.

Goulds Agitator Pumps are manufactured in capacities from 2000 G. P. M. to 5000 G. P. M. for low head stock circulation, "slushing" and hydrating service.



For general water supply, the handling of white water, black and green liquors, etc., Goulds Double Suction Centrifugal Pumps are available in capacities up to 15000 G. P. M.



Goulds Multi-Stage Centrifugal Pumps are widely used for spray, shower, general water supply and boiler feed service.

Goulds Fire Pumps approved by Underwriters and Associated Factory Mutual Fire Insurance Companies.

Experienced paper mill engineers specify Goulds Pumps because they know that production costs can be lowered and profit increased by dependable low-cost pumping service.

Goulds Pumps give reliable, non-stop service for every pulp and liquid handling need over long periods and under the most unusual operating conditions.

Goulds engineers have been building pumps for the paper industry for over half a century, embodying in them improved design, skilled workmanship, durable construction and quality materials.

There are Goulds Pumps for every pumping service in the paper industry—Stock Pumps, Double Suction, Centrifugal, Multi-Stage Centrifugal, Fire Pumps and other types, are available in a wide range of capacities.

For complete information, write for Bulletin 206.

GOULDS PUMPS Inc.

SENECA FALLS, N. Y.

ATLANTA, BOSTON, CHICAGO, HOUSTON, NEW YORK, PHILADELPHIA, PITTSBURGH, TULSA. Representatives in all Principal Cities

WHERE A LIFETIME IS 15 YEARS

and the 15 YEARS ARE UP!

IT is conceded by many that the top efficiency lifetime of any paper machine is 15 years. So, since 81% of the paper machines now operating were installed *prior to* 1920, this year of 1937 finds most of them beginning to run up excessive costs—wasting power, slowing up production, increasing the number of repairs. ¶ Even if your machine investment has long been written off your books, you cannot write off those excessive operating costs. ¶ Far cheaper than to let them continue is to modernize your machines—which, in many cases, will suffice to insure efficient operation for more years to come—without waste, without loss of time, and without the drain of constant repairs. ¶ An S & W Modernization Engineer, called in to inspect your paper making machinery, will—without charge or obligation—tell you where (and for how much) you should have those important improvements made. ¶ Later, if you wish, working with you and your consulting engineer, S & W, builders of the two widest Fourdriniers operating today on the finest tissue and condenser papers, will make use of its experience to make rehabilitation, for your mill, a low-cost process. ¶ A letter to S & W will schedule a call. Meantime, you may wish, like many of your neighbors, to read "Carrying the Torch," which tells a dramatic story of paper making in this country and S & W's experience and present facilities. Write for it today.

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● Only one pair of hands; but placed on the handle of a YALE Hand Lift Truck—they match the power of a hundred horses!

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WE'LL BE GLAD TO SEND YOU NAMES OF INDUSTRIAL LEADERS EVERYWHERE WHO ARE SAVING TIME AND MONEY THE YALE TRUCK WAY

PAPER . . . At the mill or paper warehouse, Yale Hand Lift Trucks transport heavy loads easily and safely. They add speed to all operations of production.

SPEED ECONOMY **YALE** SAFETY EFFICIENCY

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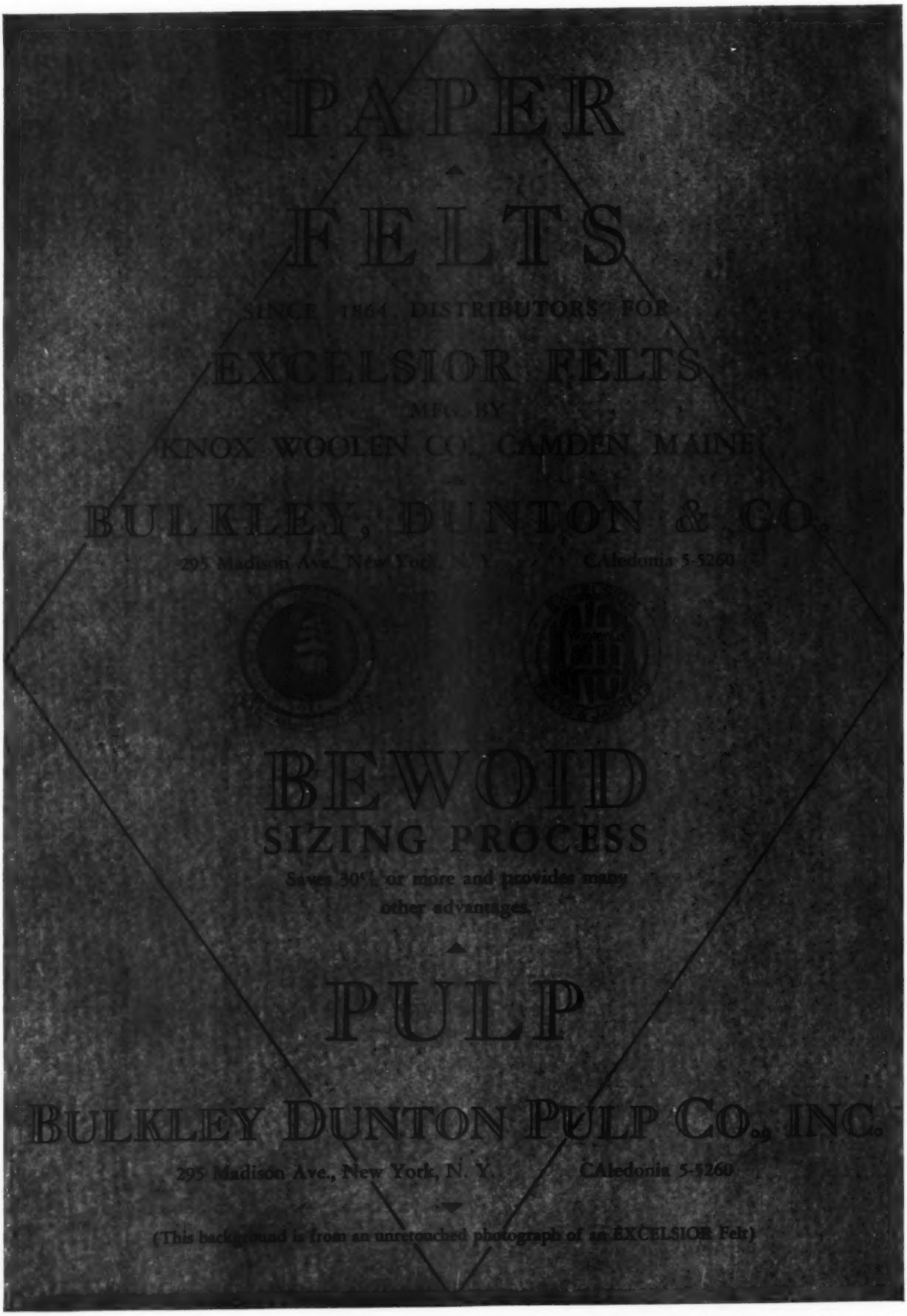
THE YALE & TOWNE MANUFACTURING COMPANY PHILADELPHIA DIVISION PHILADELPHIA, PA.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(This background is from an unretouched photograph of an EXCELSIOR Felt)

Soliloquy on Shortages

SHORTAGES, drastic shortages and world-wide shortages of essential commodities are confronting the consumer everywhere. These are coming to public attention with the deadly certainty and untimely frequency of an outbreak of public pestilence.

It has now developed that there is a world-wide shortage of iron and steel, a world-wide shortage of copper, a world-wide shortage of rubber, and a world-wide shortage of chemical pulps. While all of the above commodities are more or less essential to the operation of industry, the unprecedented shortage of chemical pulps culminates in a shortage of paper—the real essential commodity—indispensable for the continuous operation of business.

Why should the consumers of commodities be surprised at these world-wide shortages all coming to a crisis at this time? "It never has happened in just this way before." Of course not. For in the history of the world, we have never faced a culmination of so many world-wide conditions which make for drastic world-wide commodity shortages.

Take a moment's thought on the matter.

Seven years ago this country joined with Europe and the rest of the world in the world-wide depression. Oh, yes we did! And in spite of the fact that we had been warned never to enter any "foreign entanglements," we did enter them—and how. "Foreign entanglements," we have found to our sorrow, are not alone political. That's where we made our mistake. We presumed the century-long warning was against "foreign political entanglements." But we now are painfully aware that "foreign economic entanglements" are as deadly as the political brand. The economic entanglements were impossible to avoid. So, in we went, and as a result we emerged clipped and sheared of our growth of current assets and with a horrible dent in our permanent wealth.

Then, for seven years we domestically engaged in a gigantic curtailment of production, first manifesting itself in a hand-to-mouth buying campaign which automatically curtailed production of industrial commodities. Then followed five years of artificial agricultural curtailment which for sheer idiocy and purblind planning never has been equalled. Concurrent with the artificial curtailment of crops, Nature went on a rampage at the same time, scourging this country with a blasting of production which finally has compelled an autocratic agricultural authority to cry quits—but leaves us with 2,865,000 farmless tenants, empty granaries, and a domestic foodstuffs shortage of hideous proportions. This America of ours, the biggest, finest, richest consuming market in the world, endowed with land, men, brains and money to make it the most self-contained territory on earth, now finds itself all bound up with vast red tape foreign trade treaty entanglements by which foreign, industrial and agricultural commodities are admitted to this country displacing similar goods of American production and manufacture, resulting in the throwing of American labor wages to foreign producers.

Polish rye in Milwaukee, Esthonian hams in Chicago, Lithuanian bacon in Toledo, Japanese textiles in Boston, Argentine corn in Buffalo, Danish butter

in New York, Australian labor leadership in San Francisco and Canadian cheese in Wisconsin! Fine for the foreigners, but rough on the raisers and producers of American products.

Back of all these shortages lies seven lean years—seven years of the world's worst wealth wrecking wrench. Now seven years, be it remembered, is one-third of a generation—that is a long time—seven years of constant, continuous wrestling with Peripatetic problems produced a business hysteria which became well nigh habitual. Seeking industriously for a formula for business recovery, the Nation was thrust first in this direction and then another, until sane thinking, wise planning and the precepts and examples of our progenitors' successes, born from the crucible of a century and a half of experience, have been publicly ridiculed and abandoned.

That was the sad state of affairs confronting us at the opening of the present year. *But glory be!* In the last 60 days signs of returning sanity are abroad among this Nation of free men. Free men produce. Production creates wealth. The free men of this country are manifesting a spontaneous determination to remain free men and creators of wealth again, and that means that recovery will proceed in an orderly fashion and shortages will shortly be replenished. Free men will again direct their government.

The shortage of paper was preventable two years ago. An acute famine in paper cannot be averted for the next two years under the most favoring industrial and economic conditions. Note the figures below:

Operating rations of U. S. Paper Mills
First 5 weeks of 1937—89.7 per cent of capacity
First 5 weeks of 1936—77.5 per cent of capacity.

On The Mark! Get Set! Go!

LEWIS H. BROWN, President, Johns-Manville Corporation, in an address before a recent meeting of the National Association of Manufacturers discussed the future of America and what the American people can expect from business in the way of better living. So fundamental and so stimulating were his remarks that a few of them have been gleaned from the address for your reflection, cogitation and consideration.

Here they are:

"The paramount need of American business today is a new perspective. It is not our job to build a new civilization. We have but to adapt ourselves to a changing civilization.

"One great attribute of American business is its flexibility and adaptability.

"Aspirations of our fellow Americans are really very simple and very definite. They want work. They want more money. They want still more leisure. They want security against unemployment now and against poverty when they are old.

"They want more for their money—more and better things at lower prices.

"Sometimes we forget that the sole purpose of business — its entire reason for existence — is *service*.

"We are again *pioneers*—not fighting the forest or seeking to wrest from nature a hazardous existence, but fighting now to make America not merely richer, but a better place in which to live.

"The only prosperity that business can have must come from the prosperity of the whole people. That is why 'work relief' has never been a solution for unemployment. It can never take the place of the opportunity for constant betterment which only private enterprise can supply.

"Every one used to say that the elimination of the ten-hour day would be ruinous to business. But the change took place and management found a way to offset the increased costs.

"Industry believes that relief should be taken out of politics and that it should be administered efficiently.

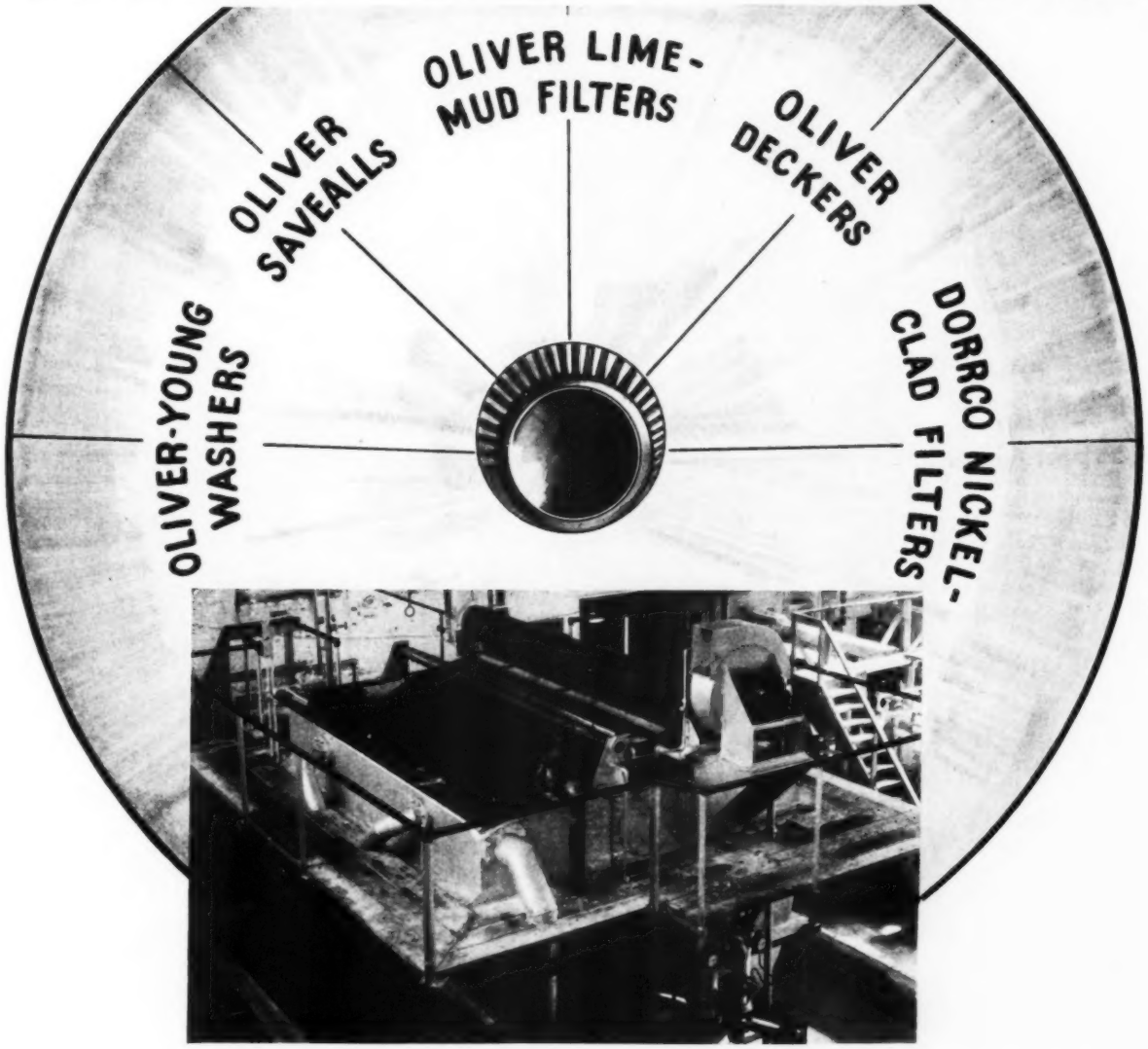
"Mass production—born and nurtured under our American system—has only one purpose: to make more and better goods and sell them for less.

"The future of the American people is being prepared in the research laboratories and in the workshops of industrial companies. Engineers, chemists, plant superintendents, merchandisers, advertising men, workers all, are creating our future.

"Who can say what are the limits of man's ingenuity? Who can say that there are any limits to the American manufacturers' improvements of the standard of living of the American people?"

Do you want comments on the above remarks? It is not believed so; therefore, they will be allowed to speak for themselves.

Selected Filters for Kraft Mills



• Each of the five Oliver United filters listed above is distinctly different. Each is designed and constructed to carry out certain kraft mill operations and to give the best results.

Back of these selected units is a thorough knowledge of deckering, washing and other kraft mill operations and some fifteen years experience in the paper field. This knowledge, combined with 30 years experience in engineering rather than just manufacturing filters for *all* the process industries, makes Oliver United's service especially valuable.

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351 California Street
SAN FRANCISCO, CAL.

"It Can't Happen Here" ...But It Is Happening!

WILLIAM SIBLEY

BACK in 1920, I began seriously to study the inroads then being made by Communism into the social and economic structure of American life. Perhaps I was unduly alarmed at that time, because on almost every hand the one result of my articles, editorials and lectures on that subject was the derisive reply from editors, readers and auditors, of: "Wolf, Wolf." They wouldn't believe my statements regarding such ancient and honorable institutions as great universities, churches, labor unions, women's clubs, et al. Few gave willing ear to my early efforts at stirring up opposition to what I then styled "sedition." Mine was a "still small voice crying in the wilderness."

Much later, Sinclair Lewis, with as much greater capability as he had prestige, created nation-wide mental and oral consideration of the eminence of the danger by writing his masterpiece "It Can't Happen Here." Today—thanks to this and similar writings, but more especially the strange acts of the New Deal during the past four and one-half years—the nation at large realizes what is likely to happen. But perhaps too late, because *it is already happening*.

Few will fail to agree that it is already happening when our leadership, both official and unofficial, condones, as an instrument for the attainment of so-called social justice, the crime of trespass. It is already happening when a labor leader dares openly to demand of the President of the United States that he stand and deliver; dares openly to command the President to pay, forthwith, a political debt. It is already happening when the Secretary of Labor asks of Congress a law which will empower her, as a mediator in labor disputes, to subpoena witnesses (be they presidents of steel mills or presidents of paper mills), place them under oath and, by force of law, compel them to testify. It is already happening when the President of the United States so changes the character of the Supreme Court, through physical padding, that that judiciary will interpret (or misinterpret) the Constitution in accordance with his desires or ideas.

It is already happening when the Secretary of Labor makes the public statement that: "Although the procedure (subpoena act) was seldom invoked by the New York State Commissioners, it worked well. The chief purpose it would serve would be to enable the Government to get at the facts in a labor dispute and to recommend findings on the basis of those facts. Moreover, the Government would thus be able to guide public opinion, which is the controlling factor in the settlement of strikes."

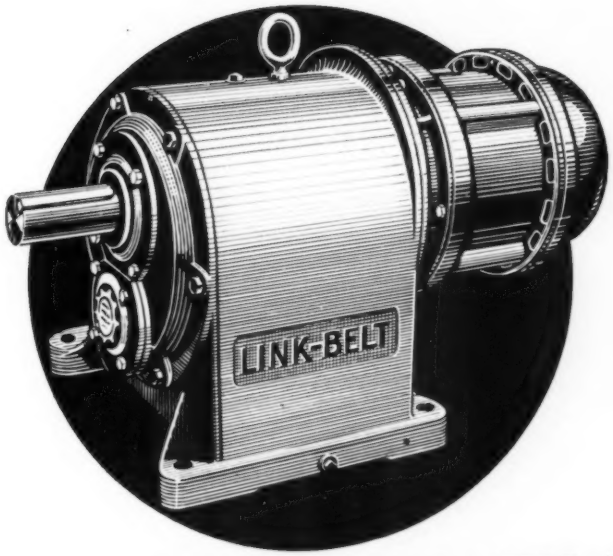
The Government to guide public opinion! Under what ideology of national life does the guidance of public opinion become a governmental function? Well—we find that ideology in that nation which teaches little children that Almighty God is a piece of window-dressing for the capitalistic system! We find it in that nation which has gone haywire over the killing of Jews! We find it in that nation which disenfranchised every citizen then with the growth of power murdered Ethiopia!

Yes—it is already happening. Right now we are faced with the spreading scourge of that European importation, the "sit-down" strike—that form of strategy which in every instance of its imposition has prefaced political revolution, with communism or dictatorship following as the result. The "sit-down" strike is revolution itself and unless checked will inevitably lead to political revolution in the United States—that nation which housed millions of citizens who once said "it can't happen here."

Through the "sit-down" strike, collective bargaining has ceased to exist. Collective bludgeoning is the order, and this bludgeoning, if permitted to continue, will soon bludgeon out of existence every safeguard the American people have ever known under a government by law.

The questions of the "sit-down" strikes, or Madam Perkins' "subpoena" act, are not questions affecting only industry and labor, but ones that involve the whole of the people. The question of Supreme Court padding is not one affecting only the relationship of the Executive and Judiciary departments, but one affecting the whole of the people. If industrial plants can be taken over and held unlawfully for indefinite periods by a handful of revolutionists, by and with the actual assistance of government, then property rights no longer are secure. If one department secretary can, by force of law, compel the testimony of any individual in the United States, then our franchise is worthless. If our Judiciary is to become a rubber stamp, then we no longer have a tripartite government.

Gentlemen—and Ladies—of the Paper Industry! You are involved! Whether you know it or not—*it is happening!* Your back is to the wall, and unless you wish to forfeit your personal and property rights you must fight. Each of you are members of some organization. Rotarians, Kiwanis, Boosters, Lions, Chambers of Commerce, D. A. R., P. T. A., Masonic, K. of C.,—*something*. Write and protest, individually and collectively, to your senators, congressmen, governors, mayors, sheriffs, newspaper editors. Believe your sober judgment—*it is happening*. And unless you fight—it won't be long now!



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● The Link-Belt motorized helical gear speed reducer provides unusual compactness; lower first cost and installation expense; smooth, quiet operation; and adaptability to varied arrangements — plus many in-built features which result in high efficiency, durability and low-cost power transmission. Made in double and triple reductions, covering a wide range of ratios and horse powers. Send for Catalog No. 1515. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, or any of our offices located in principal cities.

CLARK CONTROLLER SERVICE

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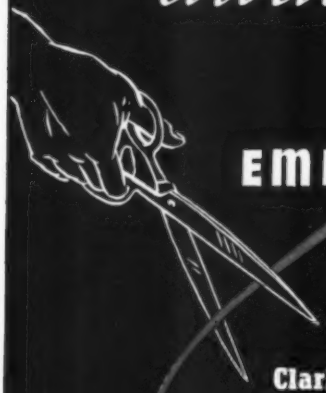

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The Clark A. C. Automatic Across-the-line Starter for squirrel cage motors eliminates the separate safety switch between the starter and the power line

Clark's response will be in sympathy with the conditions that prompt your call. Manufacturers, railroads, utilities, municipalities and other users of electrical equipment who are occupied with projects of modernization, rehabilitation or new construction will find the Clark force anxious to assist. Red tape will not be allowed to interfere.

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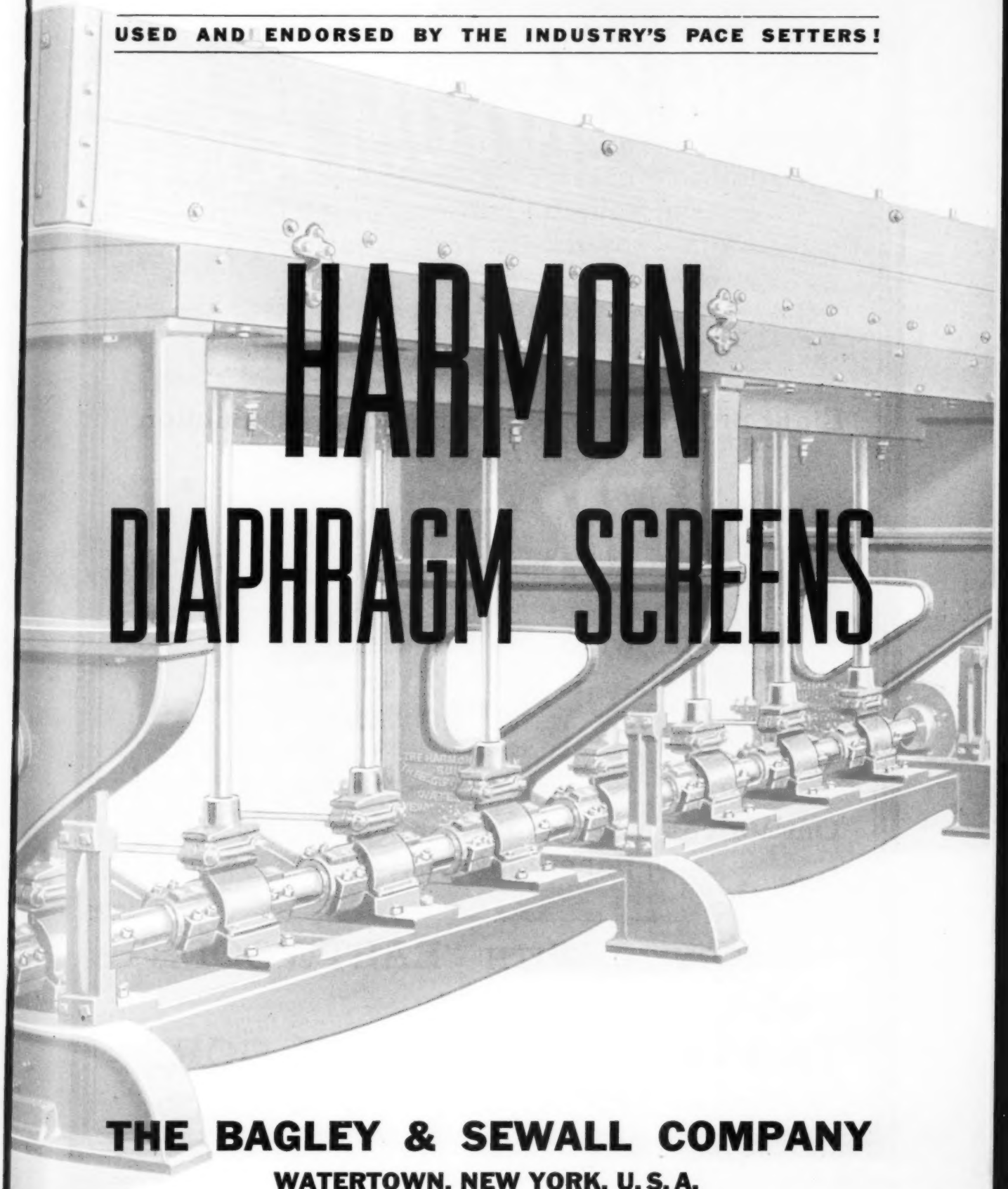

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THE BAGLEY & SEWALL COMPANY

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Our organization — in its research work — is rendering a service to *your* industry. When we serve you, the benefits of this work are available to your company.

EASTWOOD

Eight progressive companies ordered Suction Box Conditioners in January.

ON

For paper finish and wire life Eastwood Wires will serve you well.

WIRES

Our Valves and Steam Traps complete a line of paper mill specialties.

MODERNIZE WITH "EASTWOODS"

EASTWOOD-NEALLEY CORP.

BELLEVILLE, NEW JERSEY

WHEN MOTORS DIE

-SO DO MEN

*Shell's "Invisible Element" is a combination of Shell's unmatched world-wide resources; decades of cumulative experience and research by Shell's engineers and scientists; Shell's modern laboratories and refineries. It is the determination to make lubrication more efficient, more economical for you.

Between Tragedy and Safety . . . Failure and Profit . . . stands Shell's "Invisible Element"*

A TRAWLER smashes her way through mountainous seas, homeward bound. Below decks an engineer stands by a perfectly functioning Diesel, confident in her performance . . . she's lubricated with Shell products!

Wherever wheels must turn . . . in mills and mines and ships at sea . . . Shell engineers have set for themselves the task of developing a more perfect, more economical lubricant.

Into every gallon of Shell Lubricating Oil, every pound of Shell Grease, have gone the efforts of these men.

As a result, Shell offers a line of lubricants which is successfully meeting *thousands of industry's varied needs.* Preventing wear, conserving power . . . providing real savings in maintenance costs.

* * *

Do you face a particular lubrication problem which Shell might help you solve? A request addressed to Shell Industrial Lubricants Division, Shell Building, San Francisco; or Shell Building, St. Louis; or 50 West 50th St., New York, will bring a representative to your offices at no obligation to you.

Shell Oils in Action!

Captain Frederick B. Wrege, skipper of the *Effort III*, testifies to the outstanding performance of Shell Marine Argus Oil!

"For your information, I wish to state that my fishing boat, *Effort III*, is equipped with 180 H.P. Fairbanks-Morse Diesel Engines, and for quite some time I have been using Shell-Marine Argus Oil 46 for the lubrication of this equipment.

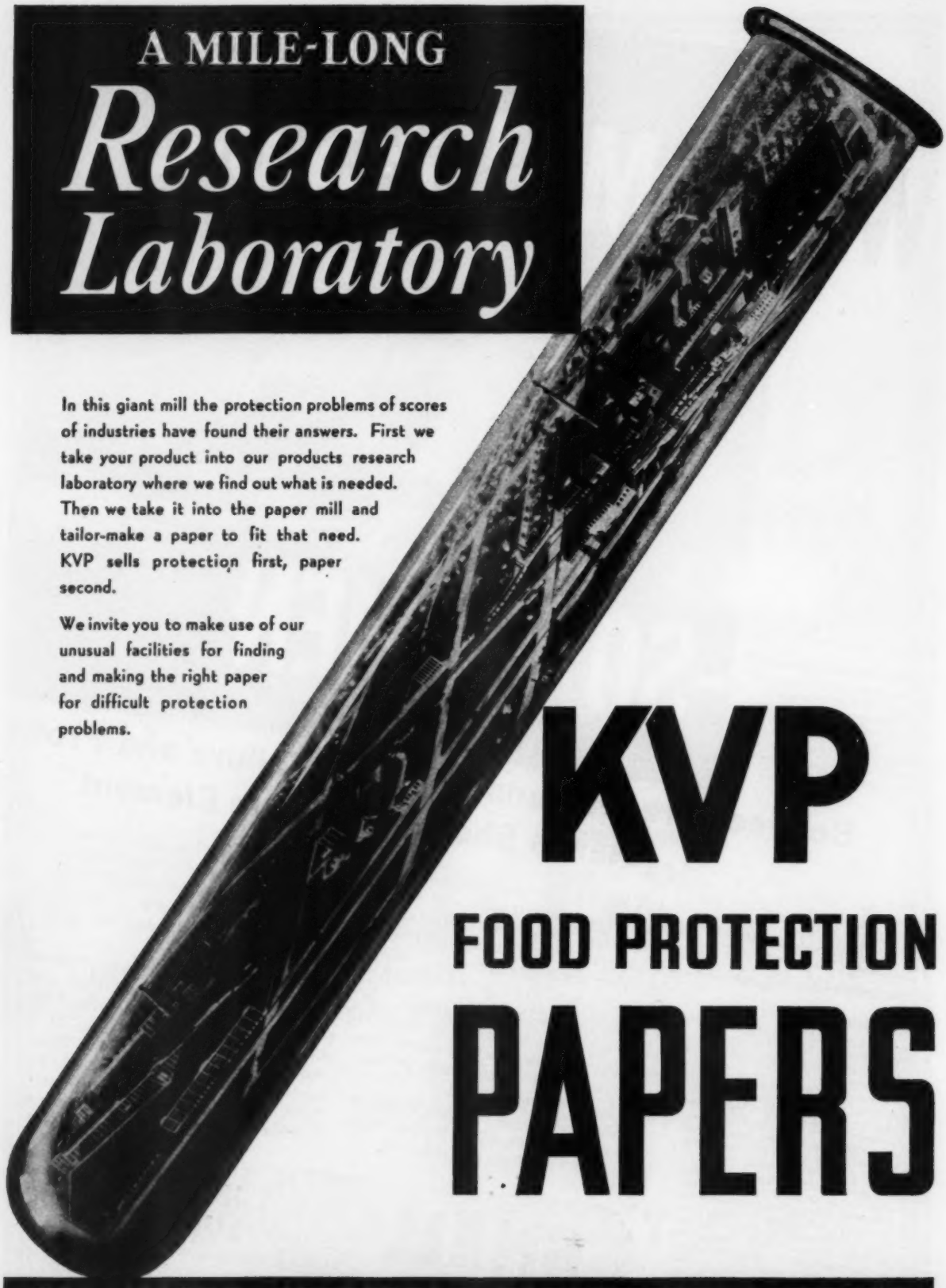
"Upon examination of the engines, after six months of operation, the following interesting facts were observed: (1) No evidence of ring sticking. (2) Practically no carbon deposits present. (3) Absolutely no sludging of lubricant. (4) No cylinder, wrist-pin or crankpin wear.

"I further observed an agreeable reduction in oil consumption while using Shell Marine Argus Oil 46."

Signed: FREDERICK B. WREGE

SHELL INDUSTRIAL LUBRICANTS

A MILE-LONG *Research Laboratory*

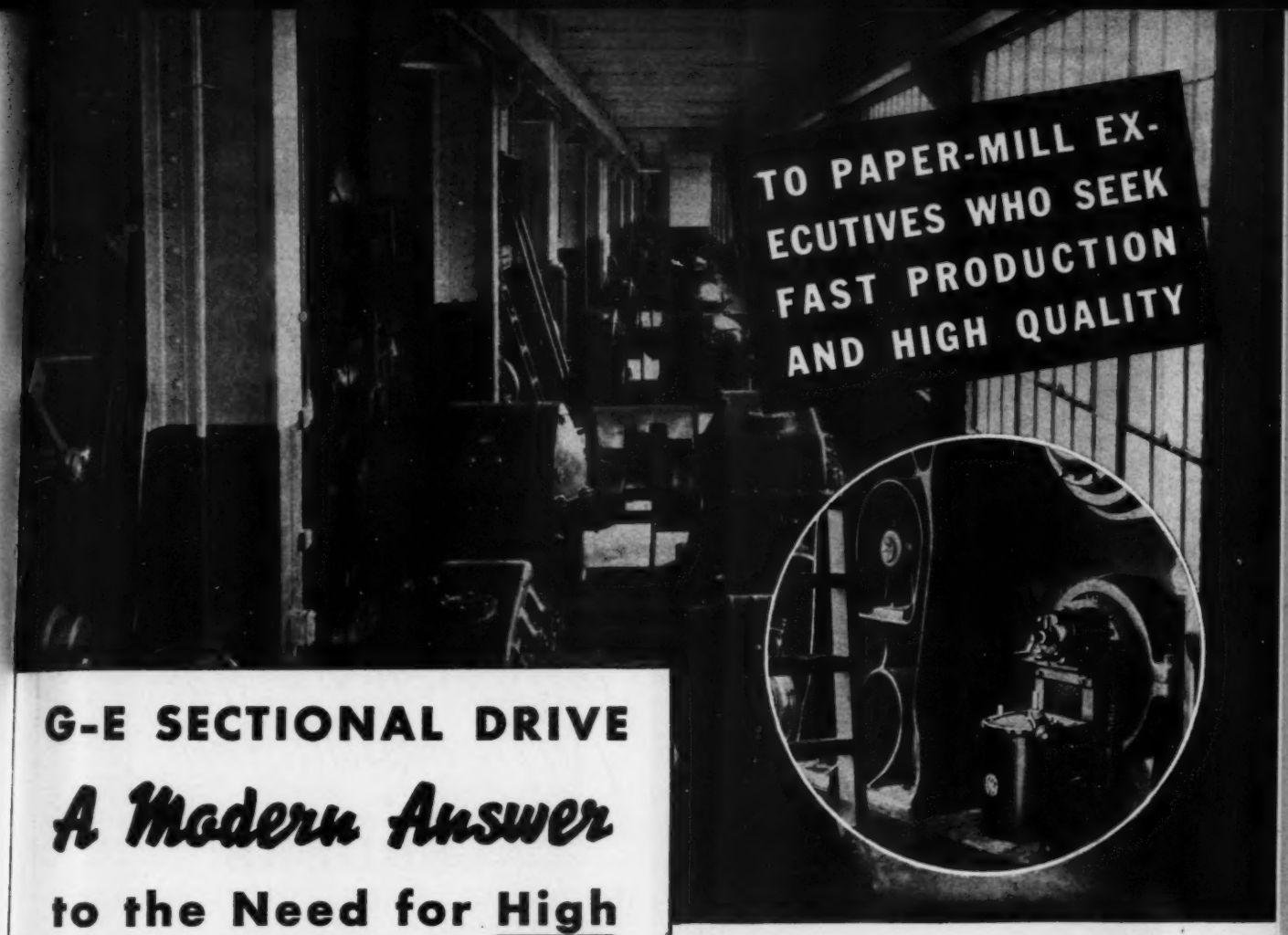


In this giant mill the protection problems of scores of industries have found their answers. First we take your product into our products research laboratory where we find out what is needed. Then we take it into the paper mill and tailor-make a paper to fit that need. KVP sells protection first, paper second.

We invite you to make use of our unusual facilities for finding and making the right paper for difficult protection problems.

KVP
FOOD PROTECTION
PAPERS

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT (KALAMAZOO P. O.) MICHIGAN



G-E SECTIONAL DRIVE

A Modern Answer to the Need for High Speed and High Quality

View of G-E sectional-drive system showing Pusey and Jones paper machine in new Union Bag and Paper Co. mill, Savannah, Ga. Inset: Typical G-E Selsyn control for adjustment of draw—an important item in the sectional drive system.

G-E SECTIONAL drives for paper machines make possible increased production, less spoilage, and a better-quality product — three important advantages in meeting today's rapidly increasing demand for paper and paper products.

This system of sectional drive:

1. Properly synchronizes the operation of all sections of the paper machine to maintain the steady draw between sections which assures high production.
2. Permits *complete control* of the machine as a unit from a central point and any individual draw adjustments from the front side of the machine.

The successful operation of this system is made possible largely by the use of Selsyn regulating equipment, exclusively manufactured by General Electric.

Many paper mills are now using the G-E system of sectional drive and have proved its advantages in their own plants. A recent installation of G-E sectional drive is in the new kraft-paper mill of the Union Bag and Paper Co., at Savannah, Ga., on a machine designed to produce paper at speeds up to 1200 feet per minute. Within a few months of the initial starting, this machine is already operating at essentially top speed. For details about the application of this drive write General Electric, Schenectady, N.Y.

011-155

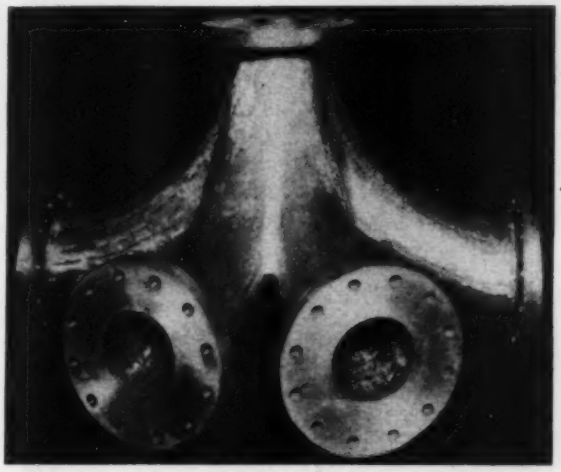
GENERAL ELECTRIC

The Supremacy of
PERKINS
CALENDER ROLLS
is the natural result
of the broadest
experience in the
paper industry
CALENDERS
SUPER • GLASSINE • FRICTION
EMBOSSING • LABORATORY
SHEET
B·F·PERKINS & SON, INC.
ENGINEERS AND MANUFACTURERS
HOLYOKE·MASS
NO CALENDER
CAN BE BETTER
THAN THE ROLLS
IN IT

★"Cooper 22"

FOR LONGER SERVICE

THE ORIGINAL HIGH CHROME NICKEL ALLOY FOR SULPHITE MILLS



950-Lb. Casting for Blow-Off Fitting

The Tried and Proved Metal for

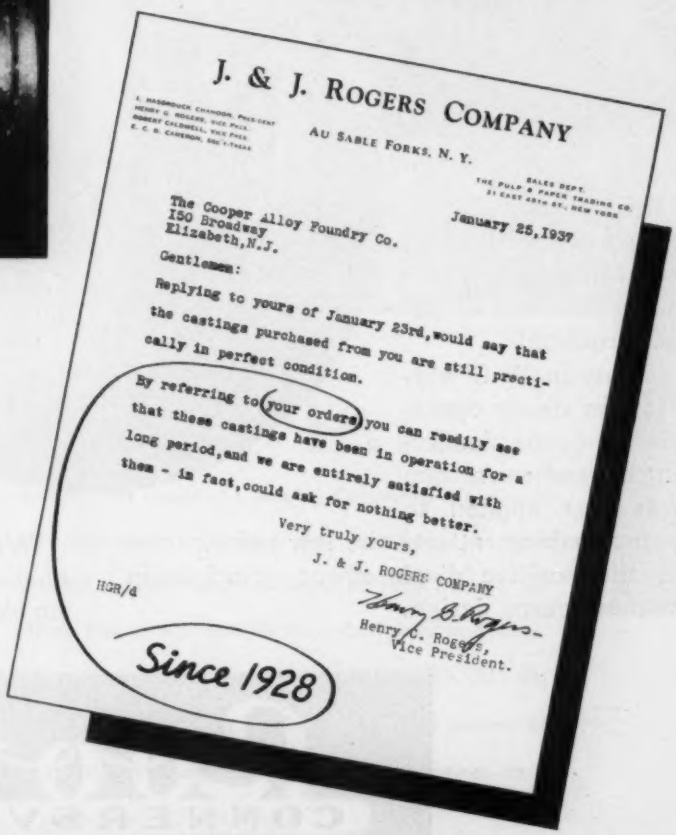
CORROSION RESISTANCE *in the* PAPER INDUSTRY

• •

Special Castings
(Rough or Machined)
Pipe Fittings, Valves
Centrifugal Cast Pipe

As producers of corrosion and heat-resisting alloys exclusively... PROMPT SERVICE GUARANTEED

Licensed under Chemical Foundation Patent No. 1339378



J. & J. ROGERS COMPANY

AU SABLE FORKS, N. Y.

SALES DEPT.
THE PULP & PAPER TRADING CO.
31 EAST 40th ST., NEW YORK

January 25,1937

The Cooper Alloy Foundry Co.
150 Broadway
Elizabeth,N.J.

Gentlemen:

Replying to yours of January 23rd,would say that the castings purchased from you are still practically in perfect condition.

By referring to your orders you can readily see that these castings have been in operation for a long period,and we are entirely satisfied with them - in fact,could ask for nothing better.

Very truly yours,
J. & J. ROGERS COMPANY

HGR/d

Henry C. Rogers,
Vice President.

Since 1928

THE COOPER ALLOY FOUNDRY CO. ELIZABETH NEW JERSEY

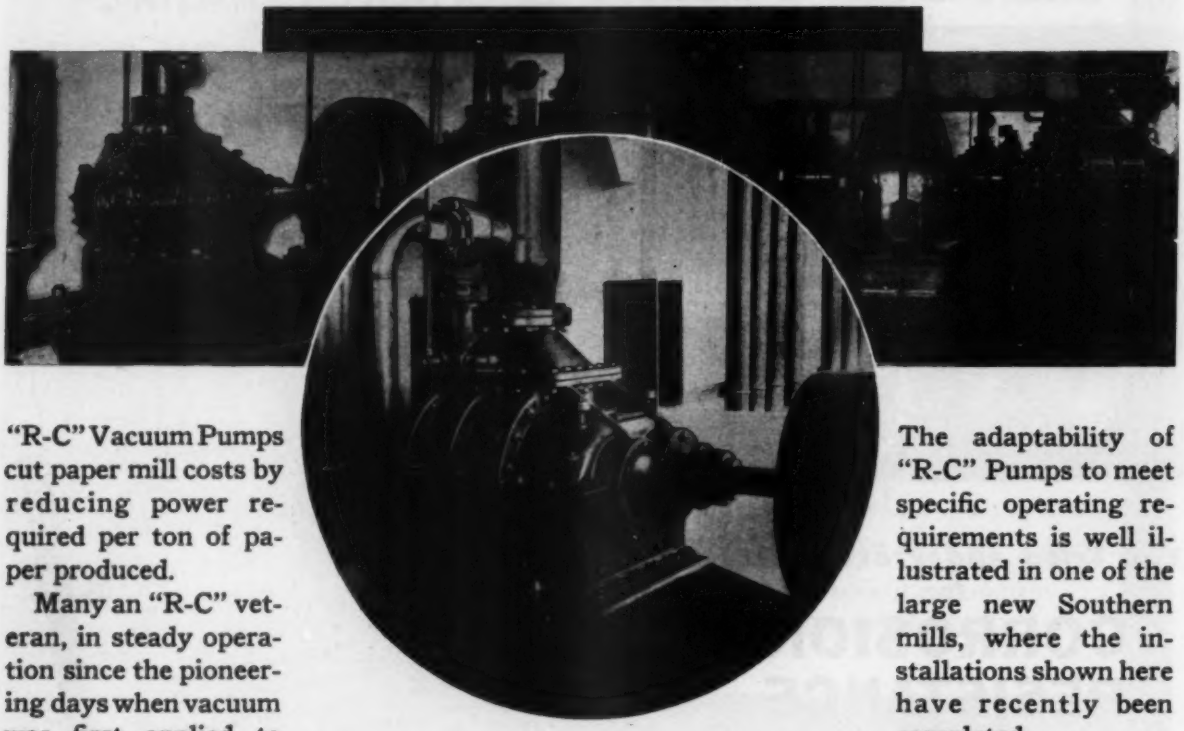
Distributors:

JOS. T. RYERSON & SON, Inc., Chicago, Milwaukee, Cincinnati, Cleveland, Buffalo, Detroit, Philadelphia, St. Louis, Boston, Jersey City
KINGSPORT FOUNDRY & MFG. CORP., Kingsport, Tenn. - - - - - - STARKE FOUNDRY & MFG. CO., Richmond, Va.

★ *Originally known as "SWEETALOY 22"*

for Steady Suction
and
Low Power Costs
MODERN MILLS HAVE CHOSEN

"R-C" VACUUM PUMPS



"R-C" Vacuum Pumps cut paper mill costs by reducing power required per ton of paper produced.

Many an "R-C" veteran, in steady operation since the pioneering days when vacuum was first applied to paper making, attests the low upkeep cost of the positive displacement principle in vacuum pump design.

The adaptability of "R-C" Pumps to meet specific operating requirements is well illustrated in one of the large new Southern mills, where the installations shown here have recently been completed.

Write for more detailed information, including Bulletin 50-B10. There is absolutely no obligation.

Roots
CONNERSVILLE
BLOWER CORP.
CONNERSVILLE, IND.

TOMORROW'S ENGINEERING APPROVED BY YESTERDAY'S EXPERIENCE

COLUMBIA

The Columbia River a few miles below Bonneville Dam.

PEACE....

Nature has made the mighty Columbia River wild and turbulent in places, but in others she has graced it with a smoothness of rare beauty inviting peace of mind. ● Manufacturers and other users of the products of THE COLUMBIA ALKALI CORPORATION also find an enviable peace of mind in the quality, uniformity and service that is a part of COLUMBIA.

COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
CALCIUM CHLORIDE
LIQUID CHLORINE

THE COLUMBIA ALKALI CORPORATION

BARBERTON • OHIO

NEW YORK • CHICAGO • CINCINNATI • PITTSBURGH

POWELL

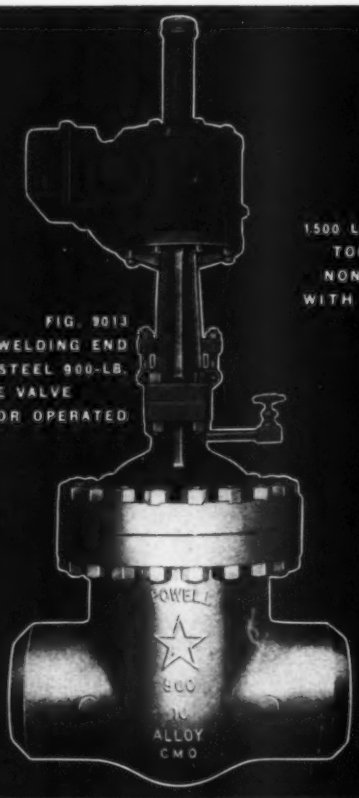
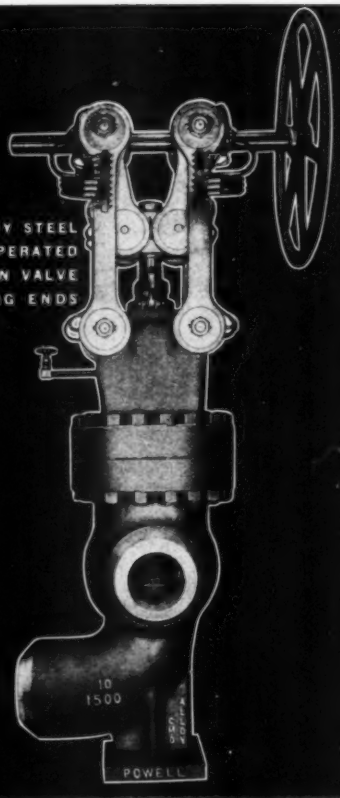


FIG. 9013
WELDING END
ALLOY STEEL 900-LB.
GATE VALVE
MOTOR OPERATED



1500 LB. ALLOY STEEL
TOGGLE OPERATED
NON-RETURN VALVE
WITH WELDING ENDS

STEEL VALVES

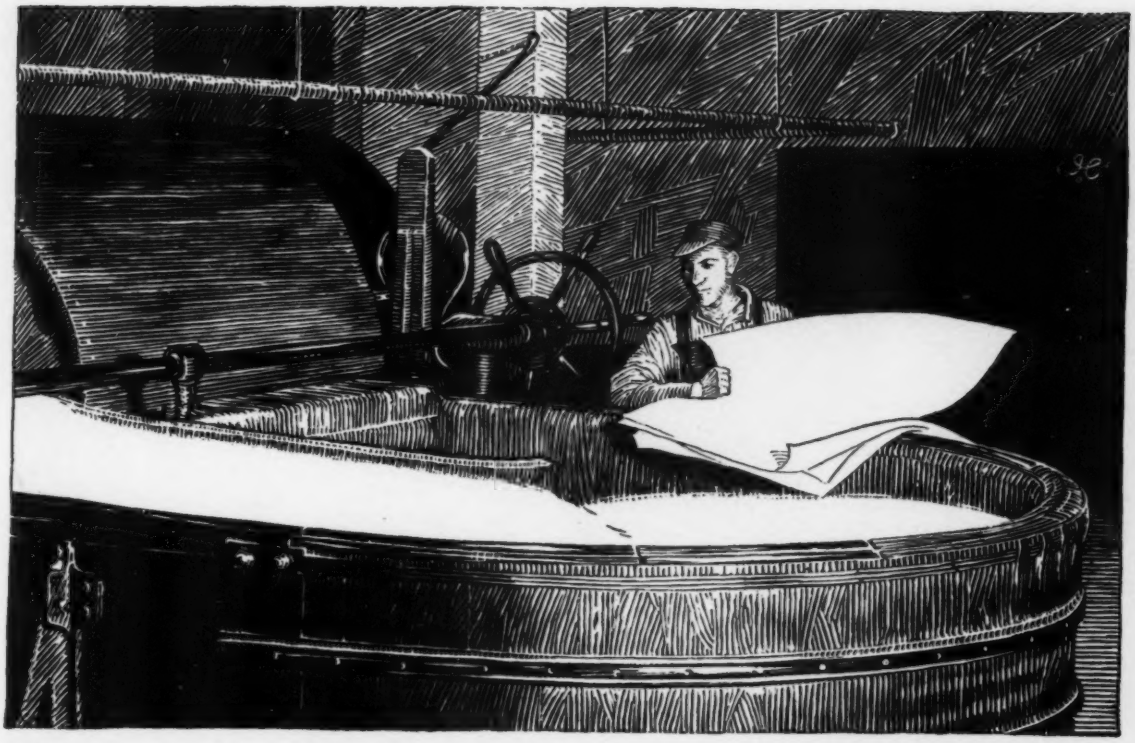
DESIGN — POWELL VALVES — improved, redesigned, and modernized to meet the exacting demands of high-pressure and high-temperature operating conditions.

MATERIALS — POWELL VALVES of cast carbon, carbon molybdenum, chrome nickel molybdenum, and 4 to 9% chrome — .5% molybdenum steels — with a variety of alloy valve trimmings.

WORKMANSHIP — Exacting workmanship, with all valve parts accurately gauged to correct tolerances, to insure long, dependable service.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO



UNIFORMITY *in Your Beaters*

PULP of uniform quality provides the paper maker with a known ingredient. It enables him to standardize on his beating procedure for any given stock with assurance that established beating time and roll settings will have the desired effects. The uniformity of Weyerhaeuser sulphite is the result of constant production control maintained by men who will continue to furnish paper makers with a reliable material—a pulp that can be counted upon to meet the requirements of your production schedule.

PULP DIVISION • WEYERHAEUSER TIMBER COMPANY

WEYERHAEUSER SULPHITE
BLEACHED UNBLEACHED

LONGVIEW, WASHINGTON
Mills at
Longview and Everett,
Washington

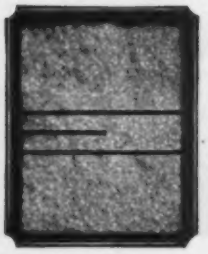
HAMILTON FELT . . . Makes Board Like This

BOX BOARD is fast replacing wooden crates for packing large heavy merchandise . . . great sheets that cover the entire unit in a single wrap, giving more protection at lower cost and at a material reduction in shipping weight. • Hamilton Felts play an important part in this. They can handle any furnish that can travel over the wires of a paper machine. Their wool fleece fibers, uniform texture and incredible strength make for faster speeds, rapid removal of water and lower manufacturing costs.

From finest tissue to heaviest board, there is a Hamilton Felt that does the job faster, better and cheaper

SHULER & BENNINGHOFEN, HAMILTON, OHIO

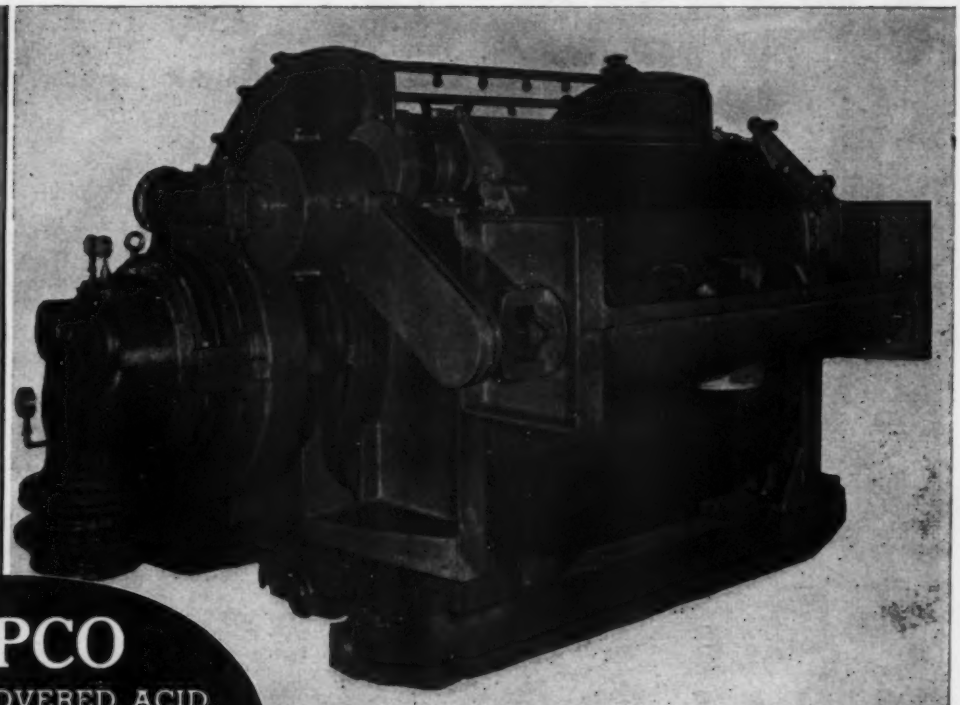
• Miami Woolen Mill, Established 1858 •



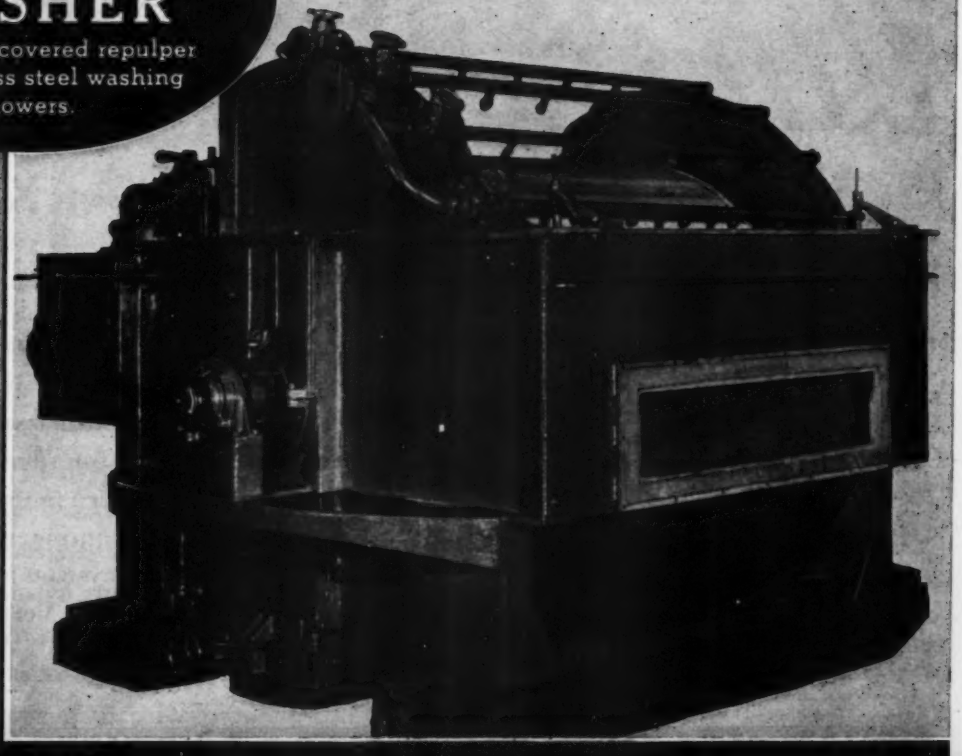
Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

Hamilton Felts

IMPCO



IMPCO
RUBBER COVERED ACID
WASHER
with rubber covered repulper
and stainless steel washing
showers.

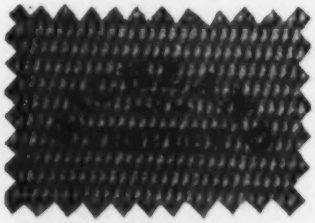


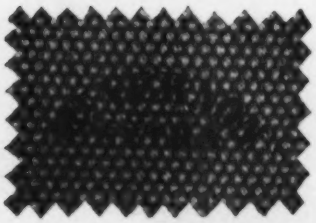
High Density Thickeners
Pneumatic Water Filters
Pneumatic Thickeners
Pneumatic Savealls
Pneumatic Washers
Cylinder Machines
Thorne Savealls
Vacuum Washers
Vacuum Filters
Flat Screens
(Dunbar Drive)
Knotters
Deckers

IMPROVED
PAPER MACHINERY
CORPORATION
Nashua, New Hampshire

What

IS BACK OF THE TRADE-MARK ?





RICHLAND triple-weave and MT. VERNON EXTRA dryer felts are standards of quality in the paper industry. These familiar trade-marks carry their own guarantee of satisfaction. But, they are important *only* for what they represent . . . cotton mills among the most modern in the country, operating the newest and best in plant equipment, with over 50 years of experience. That's why it pays you always to specify felts identified as products of Mt. Vernon-Woodberry.

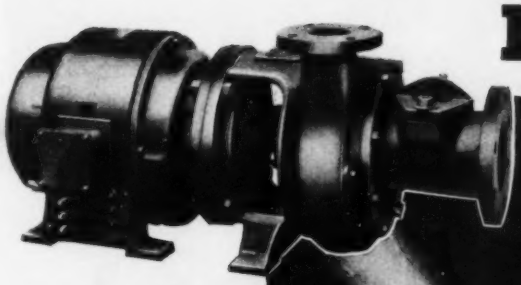
MT. VERNON-WOODBERRY MILLS, INC.

TURNER HALSEY COMPANY

40 WORTH STREET *Selling Agents* **NEW YORK CITY**

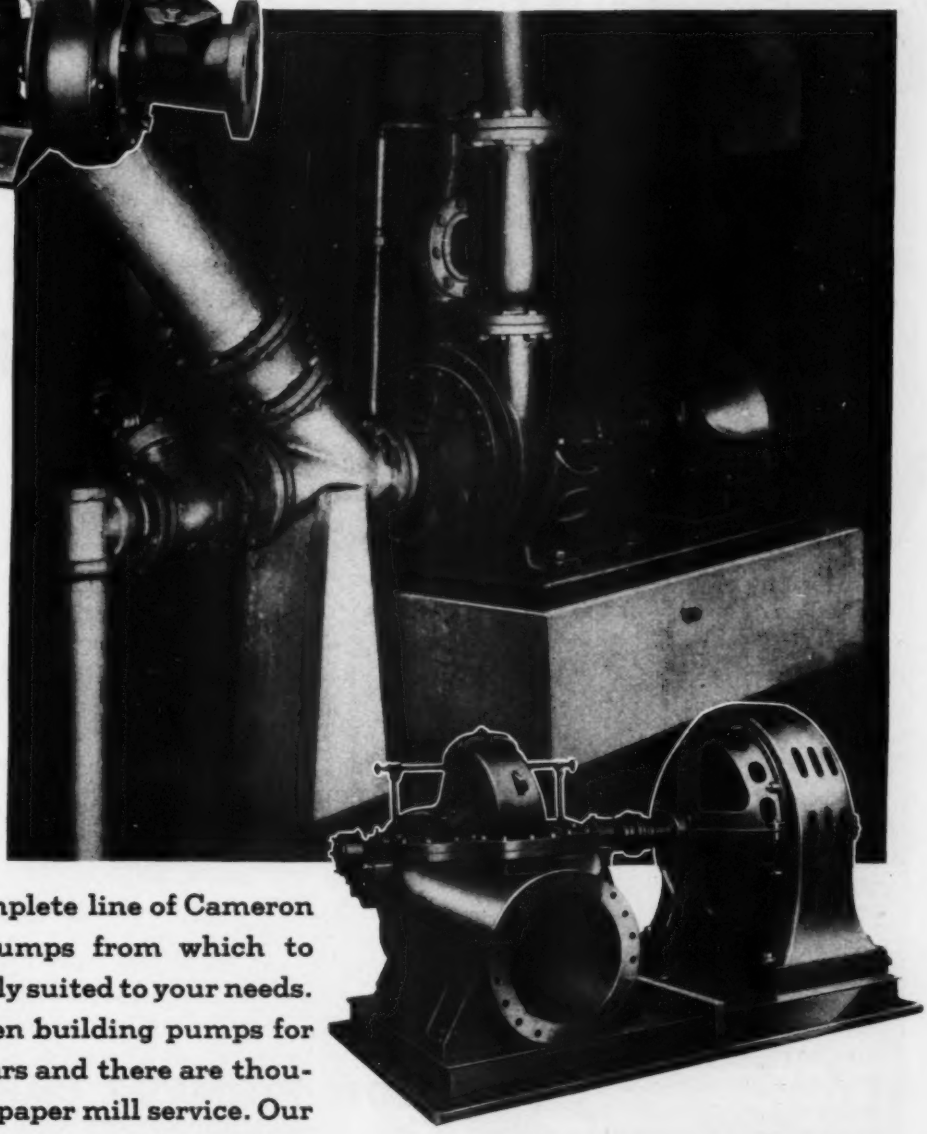
Branch Offices: SAN FRANCISCO · NEW ORLEANS · CHICAGO · BOSTON · BALTIMORE

CAMERON PUMPS
for PULP and PAPER MILLS



Cameron Motorpumps — sizes 3RVL and 4RVL as fitted with hand-hole cover. Available with two-vane open impeller and casing designed to prevent clogging. All sizes available with standard closed, or 4-vane open impeller for general work.

The Class EGV Stock Pump is designed and built especially to handle paper stock. It is reliable, efficient and its maintenance expense is low. Send for Catalog 2097.



THERE is a complete line of Cameron paper mill pumps from which to select units exactly suited to your needs. Cameron has been building pumps for more than 70 years and there are thousands of units in paper mill service. Our engineers will gladly consult with you in regard to your pump requirements.

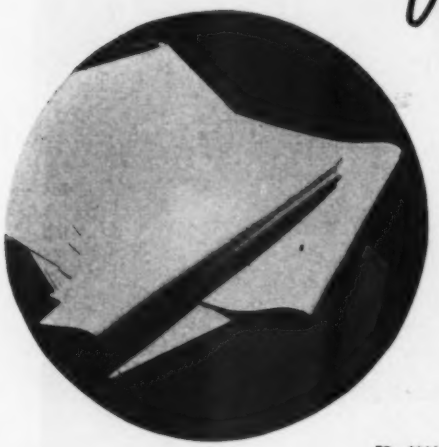
Cameron single-stage, double-suction, coupled pumps are furnished in a wide variety of sizes suitable for Mill Supply, White Water, Fan Pump Service, etc. Capacities range from 10 to 25,000 gpm. against heads up to 250 ft.

Atlanta, Birmingham, Boston, Buffalo, Butte, Chicago, Cleveland, Dallas, Denver, Detroit, Duluth, El Paso, Hartford, Houston, Knoxville, Los Angeles, Newark, New York, Philadelphia, Picher, Pittsburgh, Pottsville, Salt Lake City, San Francisco, Scranton, Seattle, St. Louis, Tulsa, Washington

Ingersoll-Rand

11 BROADWAY, NEW YORK CITY

The new measure of PAPER VALUE *Calls for:*



OPACITY
WHITENESS
BRIGHTNESS

PROPERLY used, Titanox pigments will give these qualities to your paper to a marked degree. It is the high refractive index, brightness, neutral white color, fineness and easy dispersion of these modern pigments which make possible this new measure of paper value.

Brilliant white obtained by the use of Titanox pigments is permanent. It will not discolor nor darken because these pigments are chemically stable. Their great hiding power effectively masks any discoloration caused by other constituents of the sheet.

Especially important to manufacturers is the fact that the opacity, whiteness and brightness of catalogue, magazine and other light weight stocks are definitely improved by Titanox pigments.

If you desire technical advice on how these desirable characteristics may be obtained most economically, our Paper Service Department will gladly cooperate.

Applicable to all types of Paper Stock

TITANOX-A
(Titanium Dioxide)

TITANOX-B and B-30
(Titanium Barium Pigments)

TITANOX-C
(Titanium Calcium Pigment)

Each Titanox pigment has specific uses

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT
111 Broadway, New York, N. Y. Carondelet Station, St. Louis, Missouri
National Lead Company (Pacific Coast Branch), 2240 24th Street, San Francisco, California

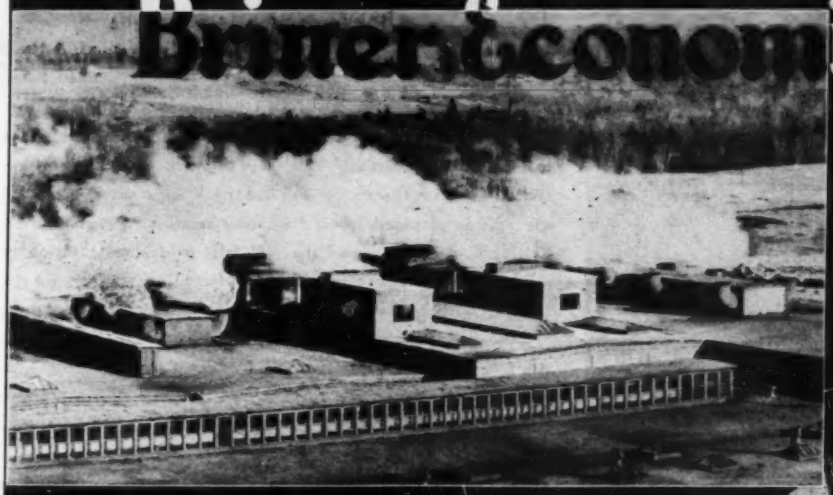
TITANOX

TRADE MARK

MODERNIZATION

should include necessary replacements of

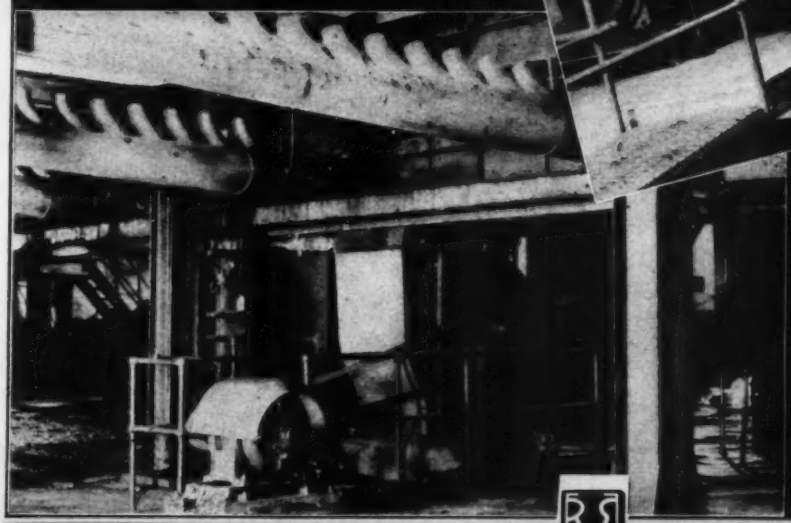
Briner Economizers



Above--Briner Economizer installation showing fan houses on Machine Room roof.

Right--Apparatus and connections.

Below--Briner Economizer installation showing Felt Supply Systems.



Because many Briner Economizers have long since paid for themselves in the savings they have effected, the normal result of long use on their efficiency has been entirely overlooked. Necessary replacements in many mills can be considered as a paying investment and should be made as a part of modernization programs. Our engineers will gladly assist in checking over your present equipment.

J. O. ROSS ENGINEERING CORPORATION

Main Office 50 MADISON AVE NEW YORK, N. Y.

201 North Wells St. CHICAGO

12953 Greeley Ave DETROIT

2860 N. W. Front Ave PORTLAND, ORE.

TOWMOTOR CLEVELAND

HAULAGE EQUIPMENT SINCE 1919

IN *Paper Handling*

SCOOPING WITHOUT DAMAGE

TOWMOTOR straight gas operated — hydraulic lift trucks truly set a high standard of efficiency and economy in better paper handling.

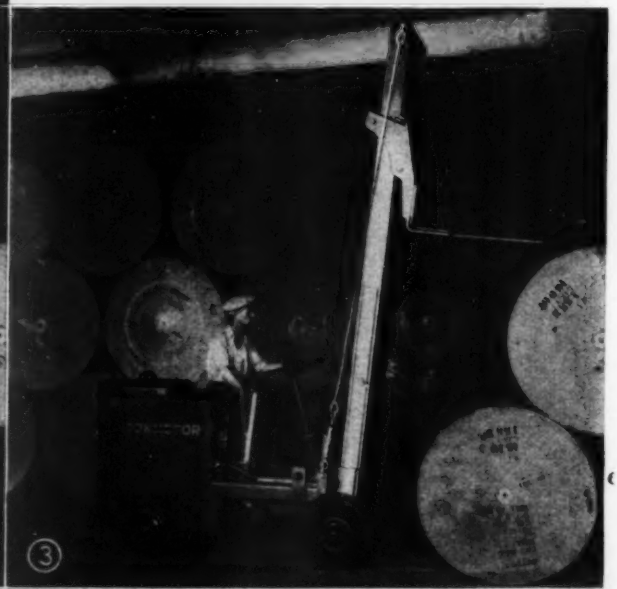
Scoops rolls from floor level — without injuring the paper. Operator safely seated in full view of work. Mast tilts back at angle to hold roll securely. As the truck approaches the stack, the roll is elevated, then the mast is tilted forward under hydraulic control — and the roll falls to desired position on stack. Equally important is the fact that all operations are performed with one operator, with speed, safety and accuracy.

Dual tired driving wheels under the load to give better traction. Steering on rear wheels for short pivot turns. Load capacity and height of lift built to suit your requirements. Straight gas powered with unusually rugged construction throughout for greater dependability and 24-hour uninterrupted service. Lowest cost per year is the real cost. Give details of your requirements and we will send prices and specifications to cover.

TOWMOTOR, INC., 1222 E. 152nd St., Cleveland, O.

New York Office; 99 Liberty St., Phone: Barclay 7-3090
Los Angeles Office; Irving G. King & Co., 708 E. 6th St., Phone: Mich. 9256

CONVEYING AND ELEVATING

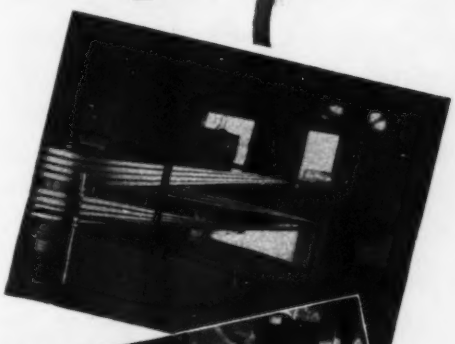


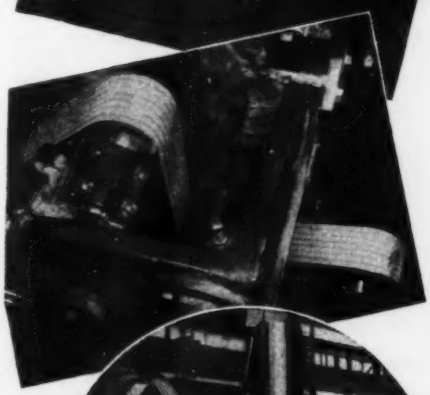
UNLOADING AND PLACING

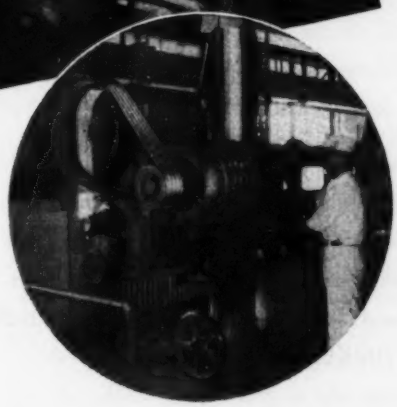
GAS HAULAGE EQUIPMENT SINCE 1919

Two (2) Big Savings

Due to the Concave Side





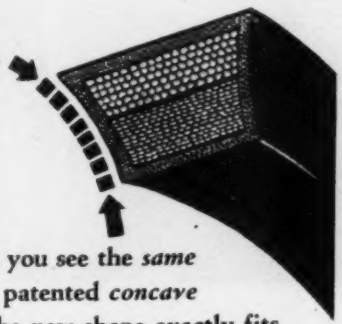


Bend any V-Belt as it bends in going around its pulley and here is what you will see:

The top of the belt, being under tension, grows *narrower.* The bottom *widens.* The sides of the belt *bulge out!* In a straight-sided belt, these stresses change the belt's shape so that it does not fit the sheave-groove—as shown in figure 1, below.

What Happens When a V-Belt BENDS

Fig. 1. Fig. 2.



Now look at figure 2. There you see the *same shape change* in a belt with the patented *concave side*—but what a difference! The new shape exactly fits the sheave groove. There is no side-wall bulge. *Two* savings result. (1) Uniform side-wall wear; *longer life!* (2) Full side-wall grip on the pulley saves slipping, saves belts, saves *power!*

The Gates Vulco Rope is the only V-Belt built with the patented concave side.

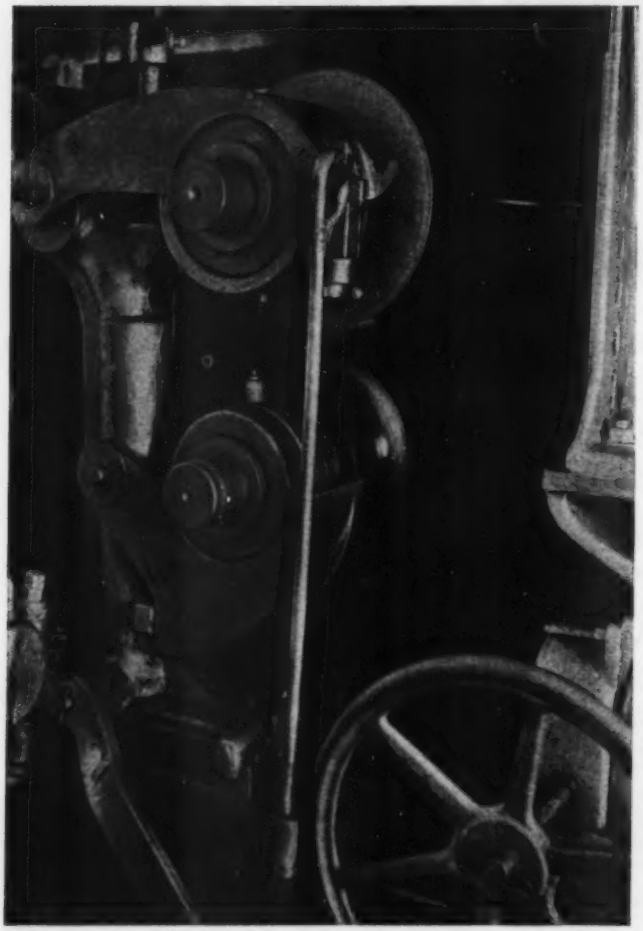
Engineering Offices and Stocks in All Large Industrial Centers.

THE GATES RUBBER COMPANY *Factory Branches*

Terminal Bldg., Hoboken, N. J.—1524 So. Western Ave., Chicago—741 Warehouse St., Los Angeles—2213 Griffin St., Dallas—899 South Broadway, Denver

GATES VULCO ROPE DRIVES

TIMKEN -EQUIPPED FOR QUALITY



Dodge-TIMKEN Special Duty (Adapter Type) S-1 Unit Mounts on paper machine.

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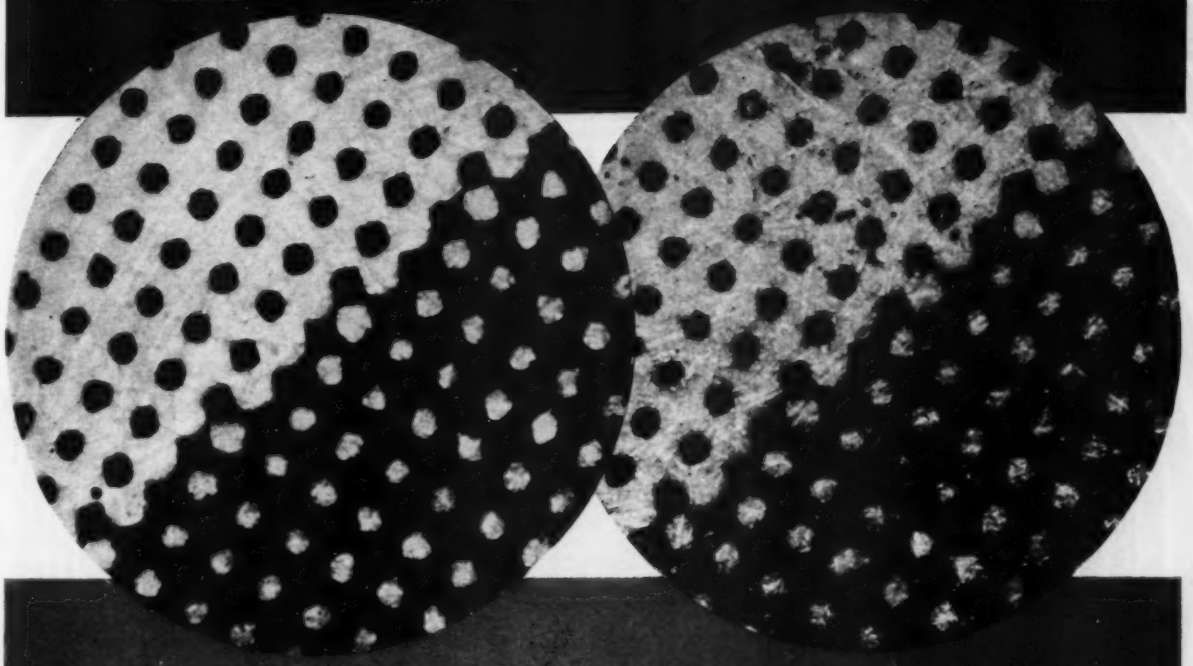

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THE two prints shown in the above photomicrographs are made from the same section of a half-tone engraving. The greater uniformity of the picture at the left is solely due to the difference in the surfaces of the papers used. You will readily see that the paper on the left will produce sharper, clearer prints than that on the right.

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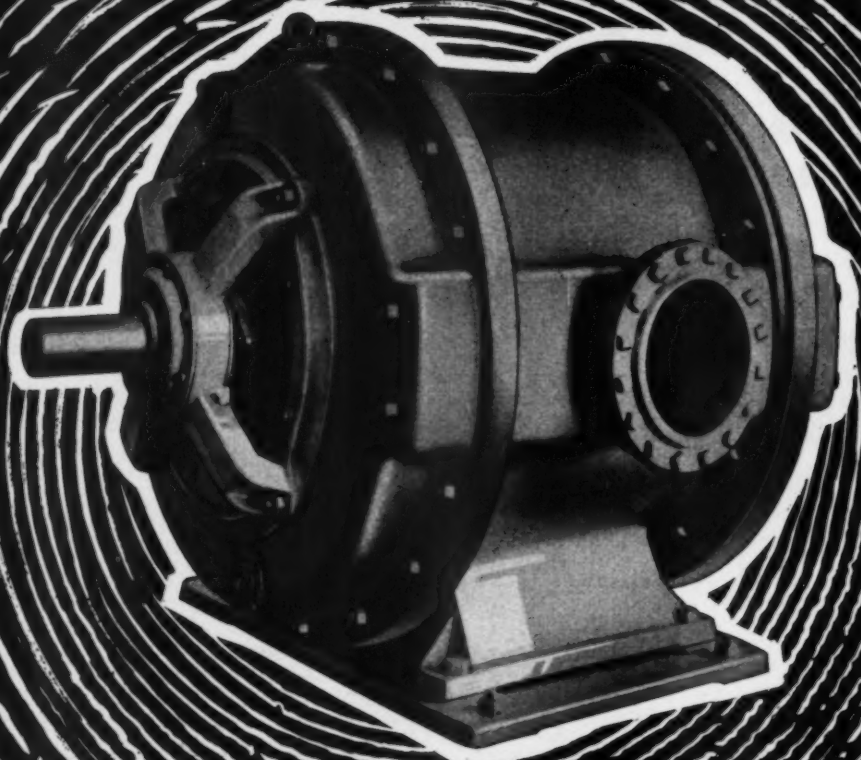

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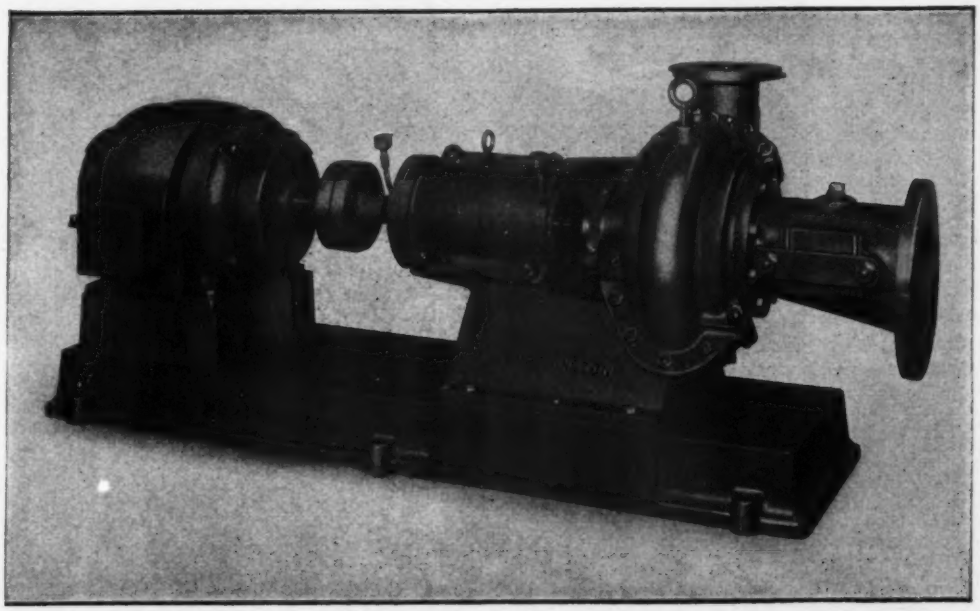

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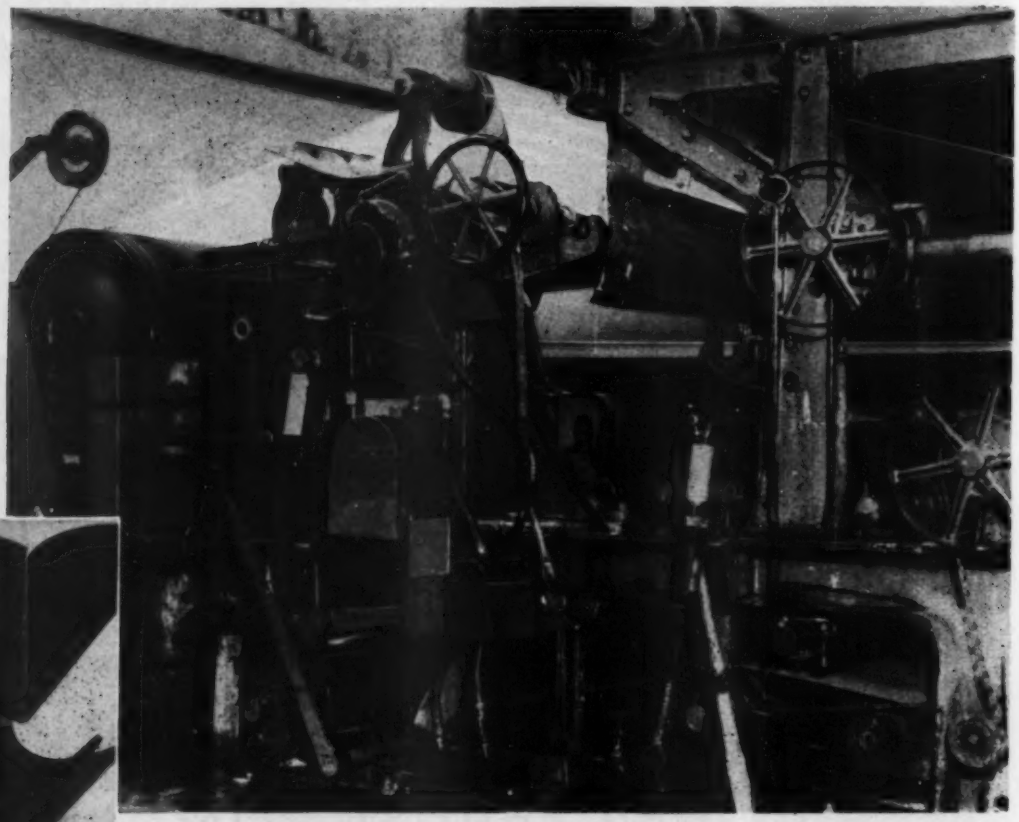
Water Lubricated Ryertex Press Roll Bearings . . . .



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THE PAPER INDUSTRY

Absenteeism in the Paper and Pulp Industry

G. J. ADAMS
International Paper Co.

ABSENTEEISM involves a considerable economic loss to both the employer and the employees concerned in any pulp and paper mill. If there is any doubt, consider for a few minutes the experience of one mill having paper, sulphite and groundwood operations and employing about 1000 people. In one twelve-month period there were:

4700 days lost due to sickness
977 days lost due to accidents
900 days lost due to miscellaneous causes

The loss in wages to employees was estimated at $28,938.80.

The loss to the employer is loss in efficiency, which is also very definitely a dollars-and-cents loss, although it is not easily figured.

Uninterrupted quality production depends upon an efficient, operating organized crew. Substitutes must be provided for absentees. New employees must be at least temporarily hired and trained for the job, or the absentee's mates must double up for him, or a temporary promotion must be made to fill the vacancy with an employee who must be given time to develop his ability to handle the job properly. Efficiency is affected. Production records are uncommon on pay days and Saturdays. Anyone who has had the experience of having to work the 11 to 7 shift in addition to the 3 to 11 because his mate did not show up, knows that he cannot and does not perform his duties during the second shift with the same alertness and efficiency as during the first.

At the plant referred to above, there were several interesting general facts disclosed in the absentee records.

(1)—Long periods of absence because of prolonged sickness were more prevalent among lower paid employees.

(2)—Short periods, usually one, two or three days were more common among the higher paid.

(3)—Lower paid employees did not take as long periods of convalescence after sickness or accident as the higher paid.

(4)—Playing "hookey" for one day to go fishing, hunting, partying, etc. and giving fake excuses was more common among the higher paid.

(5)—One-day absences are more common on Saturdays, holidays, and pay days.

(6)—True explanations of one-day absences are seldom given. Sickness is the usual excuse.

(7)—Trumped up excuses were more common among shift workers for evading the 11 to 7 shift.

Most of the above facts are naturally explained by the limitations of the wage income. Lower paid employees do not take the odd day off because they do not want to lose the wages. Their income limits to some extent their own initiative to provide prevention against sickness. The expense of medical attention delays calling the doctor until absolutely necessary.

If absenteeism is to be controlled, there are two important steps to take before attempting correction of irregularities.

First, some rule must be enforced that requires employees expecting to be absent from their regular shift for any reason, to give the plant sufficient opportunity to provide a substitute. Such a rule might be to the effect that notice must be given the foreman of such intended absence at least two hours before the beginning of the regular shift of the employee concerned. This notice should also include the reason for the absence. The record of these notices form the basis of daily investigation by some person in the plant to determine the necessity of absence, the truthfulness of the reason given and possible advice and assistance to the employee that will enable him to shorten the period of absence.

Secondly, records should be kept, both of individual employees and the general experience of the plant. A frequent study of these records should indicate the steps to be taken to correct or at least minimize absenteeism.

As sickness is the cause of over 70 per cent of absences it is evident that a medical program is a desirable asset. The plant that has a physician or a nurse or both on its staff is fortunate. It is not the purpose of this article to outline any medical program but it is very evident that physical examination at the time of employment and the opportunity of a physician's advice at the first signs of sickness will do a great deal to predetermine and prevent loss of time that might otherwise occur.

The plant nurse particularly if she is able to do community work, is a valuable aid in controlling absenteeism. A good system to follow is for the timekeeper to give the nurse a daily list of the absent employees. She then visits the homes of these employees, checks the real reason for absence and reports back to the plant. During her visits, when she finds sickness or accident, she renders an invaluable service. She is able to influence the attendance of a physician and under his supervision teach other members of the family to properly

care for the disabled person. She can advise as to prevention of disease, as to proper care when contracted and generally can influence households that otherwise would suffer. We often find employees who stay home from their work because of sickness in the family. Consider the influence of a company nurse in their cases. Knowing that she is interested and keeping in touch with his home the employee's mind is at ease and he can attend to his work without the worries of home.

Even in a plant that has no physician or nurse in its organization, loss of time from sickness and accidents can be controlled. First, the plant accident problem is one calling for a complete accident prevention program, with safety education, bulletins, committee meetings, investigations, machinery guarding and rehabilitation of injured employees emphasized. Secondly, an educational program can be undertaken to acquaint employees with their liability to sickness, the common diseases and steps to be taken for their prevention and care. Bulletins and distribution of prepared pamphlets to be taken home are common methods. Third, improve workings conditions so that plant structure will not contribute to supply the cause of sickness. Dust and fume conditions should be studied and as far as possible the cause of these conditions removed. Respirators and masks should be provided where needed but the real solution is the removal of the dust or fumes and the provision of an adequate supply of fresh air. Drafts should be eliminated. In winter most finishing rooms are cold and drafty. A 5th Hand from a hot steaming machine room, delivering rolls to the finishing room is immediately exposed to a possible bad cold. Probably a slight rearrangement at the loading doors will correct or at least partly remedy the drafty conditions. Pulpwood ponds in the wood room and pulp mill should be regularly cleaned. They have been known to be loaded with bacteria. Wet floors and dampness should be eliminated where possible and generally clean sanitary conditions should exist in toilets and locker rooms.

The instinctive sympathy of one person for another's disability usually excuses the trouble of filling the vacancy caused by the absence. So that while sickness and accident do account for the major portion of absences, it is, however, the short one- or two-day absences for miscellaneous and usually untruthful reasons that cause irritations to the foreman and the employees' mates who must take up the vacant shift when they suspect and sometimes know that they are inconvenienced because the absentee wanted to satisfy some personal desire. This is particularly true if the absence was not prearranged, and this type of absenteeism is the most difficult to control. Sickness is the most frequent excuse given and if there is no system of checking, these impositions increase. The threat of loss of job is the usual method to attempt to control this type of absence. It doesn't work, however, at least not consistently. Suppose John Jones who has the reputation of being the best machine tender in the mill doesn't show up one night at 11 p. m. when a particularly important order was being made. The mill manager or superintendent reasons, "John didn't show up last night and we had a lot of trouble on the machine. Although John reported he was sick, I know he was drunk. However, John is a good man and if I reprimand him he might get sore and leave me. I know he can get a job in any of these mills around here. Guess I'll just keep quiet and maybe it won't happen again." Would this reasoning be used in the case of a wood handler or some other employee who could easily be replaced? Meanwhile, John having got away with it once becomes a regular offender and the day comes when action of some sort has to be taken, and John is the last person to understand why he is being disciplined for something he has been allowed to do for years.

Foreman interest is an important controlling factor in reducing absenteeism. One departmental superintendent makes a practice of personally checking every case of absenteeism in his department. First he insists on full knowledge of any intended absence for any reason. A prearranged extra day off is allowed, when asked, if efficient operation can be arranged. In case of sickness or accident causing extended absence, this superintendent personally visits the home of the employee and satisfies himself that the company nurse follows up the case or that he is otherwise receiving proper care. To him absenteeism in his department is his own problem as well as that of the personnel department. The result is that not only is absenteeism at a minimum in this department but there has been created a feeling of pride of organization among the crew. To his employees, this foreman is a real leader, his counsel is sought in all matters, the employees' interests are his interests. What is more natural then that this foreman's interests in efficient production are his employees' interests?

Stormy weather, planting and harvesting time for the combination farmer-papermaker, breakdown of the family Ford, county fairs, circuses and the pay day bender are only a few of the many real reasons for unforeseen absences. No definite system can be followed to control such absences other than check up, management and foreman interest and following such correcting course as the circumstances indicate. Remembering that we are all human it is not intended to convey the meaning that such absences are wrong and should not be allowed altogether but rather that they be controlled. The ideal condition would be to have the confidence of the employees to the extent that outside of emergencies these short and usually one-day absences would be made known and planned ahead of time so that operation would not be affected by a disorganized crew.

The spare-hand system was originally provided in machine rooms with the idea of insuring against interruptions in quality production, because of absenteeism, by providing skilled assistance and temporary substitutes by efficient workmen. However, the spare-hand system will at times extend to other departments in the mill and become an unnecessary and unreasonable extra labor cost in any department if carried beyond actual needs. The foreman reasons that it insures constant production but one of the real reasons is the relief from the responsibility of organizing and keeping together an efficient crew to do the job.

Absenteeism has become a greater problem since the beginning of the 40-hour week in 1933. In the spread-the-work movement practically all the available skilled help was used up to provide a sufficient number of regular operators. This condition still exists at the present time. Skilled operators today must be made—they cannot be hired. Recognition of the problem of absentee-

ism then only emphasizes another important problem—that of employee training so that an adequate supply of skilled labor will be assured both to take up the burden of temporary vacancies and to provide sufficient help to carry out the principle of limitation of hours of work. Recognizing the need of training, it is very important that employees be given an incentive in the form of higher wages in more skilled jobs by promotion from within the ranks whenever vacancies occur. All other things being equal, the employee's absenteeism record should be considered in making promotions, which is a direct appeal to the employee's desire for advancement and increased income.

Another form of appeal to the employees that will at least help to improve attendance is that of recognition by the management in the form of a definite award. Certificates, buttons, competition between departments and other forms of recognition of good attendance records will no doubt aid in reducing the time lost due to absenteeism.

It has not been intended to criticize absenteeism entirely. There are numerous cases where it would be advantageous both to the employee and the plant that his return to work be delayed. Often an employee returns after a sickness before he should, principally because of the expense of his lay-off, exposes himself to a relapse, becomes an accident hazard and causes an extra burden to the rest of the crew during the period that he is partially incapacitated.

Unnecessary absenteeism should be minimized but emphasis should be placed on control as it is reasonable to assume that a plant is not handicapped by absenteeism if such absenteeism does not interfere with efficient quality production.

Puerto Rico's Paper Requirements

EVERETT B. WILSON
Association of Sugar Producers of Puerto Rico

PUERTO RICO buys practically its entire requirements of paper and paper products from continental United States, and its purchases during 1936 have been estimated to be the largest in more than ten years. No paper whatsoever is manufactured on the little Island, owing to the absence of raw materials, and imports from foreign countries are negligible, with the exception of a small quantity of newsprint.

The Island's timber supply was practically exhausted before it became a part of the United States in 1898, and the only remaining timber consists of ausubo and other extremely hard woods. The Federal Government is encouraging the replanting of mahogany on a rather large scale, but there is little reason to believe that paper ever will be manufactured in Puerto Rico.

The purchases from manufacturers in the States are made up principally of wrapping paper, paper bags, and writing paper. Paper boxes and cartons are used only to a limited extent because there is relatively little manufacturing on the Island. Its income comes principally from the sale of raw sugar, unmanufactured tobacco, and fruits to the mainland United States, although the needlework trade also provides considerable employment and income.

Total shipments of paper and products to Puerto Rico during the year just closed were about $1,600,000, judging by the figures for the first eleven months. This represents an increase of about $100,000 or 6 per cent over the preceding year.

Although the Island has spent approximately $13,000,000 for paper and products purchased from the States during the last ten years, a large potential market still remains. Consumption of paper is considerably lower than it would be if conditions were more improved. The average income of the people of Puerto Rico is quite low at the present time, although it has been improving. The people have only a limited amount

Occupants of this small concrete house built by the Government are neat and clean but they have no luxuries. Wallpaper, writing paper and other paper products usually are completely absent

to spend for luxuries of any sort and must use even the necessities sparingly.

San Juan, which is the capital and principal city with a population of 138,000 people, is a relatively modern community with an average income substantially higher than the rest of the Island, and there are several other cities where the buying power is more favorable. Outside of those cities, however, paper and many other necessities are by no means as widely used as they might be.

Building paper is used only in a very limited way because most of the homes outside the larger cities are rather inexpensively built. Even the better rural dwellings, constructed by the sugar companies for their employees, cost only a few hundred dollars. There is no wallpaper and never has been any in the great majority of the homes.

Retailers in the smaller cities and country towns are

said to prefer wrapping paper to the more convenient paper bags, because of the saving in cost. The consumption of toilet tissue during recent years has averaged only one-third to one-half pound per person per year. The use of writing paper is limited mostly to business houses, schools, and government departments, with the exception of that used by the individuals in San Juan and other cities who enjoy higher than average incomes.

Newsprint consumption also is comparatively small, although the Island has 29 daily, weekly, and monthly publications. There are eleven daily newspapers with a combined circulation of approximately 80,000 copies. The largest of the newspapers is El Mundo, which has a daily circulation of around 21,000, containing 16 to 32 pages.

Business conditions have been improving steadily during recent years, however, and continued improvement is confidently expected in 1937, because of favorable conditions for the sugar, tobacco, textile, and pineapple industries. It is generally believed that any further improvement will be reflected in a wider demand for paper and most other necessities as well. The Federal and Insular governments are conducting extensive research into the possibilities of establishing additional industries to manufacture merchandise for which there will be a market in the States, and are concentrating on lines which will not compete with industries now existing in the States. It is possible that additional need for paper cartons and other paper may result from this work.

Paper is used in Puerto Rico to wrap the long Vienna-like loaves of bread. This young man sells bread from house to house in a country town

The possibilities of manufacturing wall board and other products from bagasse, a by-product of the sugar industry, have been investigated extensively, but no steps have been taken so far to establish the industry. It is believed that experimental work will be conducted by the Puerto Rican Reconstruction Administration, a governmental agency, in connection with the sugar mill recently acquired for operation under a co-operative plan. However, no definite announcement has been made regarding this project. At the present time, the bagasse is used almost entirely for fuel in the sugar mills.

There are a number of small printing plants on the Island, and several larger plants in San Juan which use approximately one million pounds of book and other papers annually.

The paper business on the Island is in the hands of about 15 mill agents, who sell mostly to the 150 jobbers located about the Island. Most of these jobbers are small factors in the trade and carry light stocks. According to one prominent agent, an order for 100 cases of toilet tissue is considered a large shipment. The size of the average sale of paper products is said to be considerably smaller than in the States. It is estimated that the mill agents will handle about 75 per cent of the paper coming into the Island, the rest being direct shipments to jobbers by the manufacturers. Puerto Rico, because of its advantageous geographical position in relation to other Latin-American Islands, and because Spanish is spoken in these other countries, resells considerable variety of all paper products. It is obvious that Puerto Rican jobbers can merchandise products to Latin-American countries in many cases more wisely than sales direct from the Mainland. There are several up-to-date stationery stores in San Juan, in which one can buy almost any type of merchandise, including a full assortment of office supplies, writing paper and other items.

During the first eleven months of 1936, shipments of newsprint to Puerto Rico increased sharply, amounted to 2,022,000 pounds, valued at $45,100. This was an increase of 30 per cent in quantity and 38 per cent in value over 1935. Sales of wrapping paper were 3 per cent smaller in quantity than in the preceding year, but the value was 9 per cent higher. Wrapping paper shipments amounted to 8,890,000 pounds, with a value of $336,000.

The Island's purchases of paper bags also declined, from 5,100,000 pounds in 1935 to 4,765,000 pounds in 1936, a drop of 9 per cent. The value of the bags was $293,000, an increase of 11 per cent over 1935. Sales of writing paper dropped substantially both in quantity and in value. The quantity purchased in 1936 amounted to 1,550,000 pounds, a drop of 18 per cent as compared with the year before.

The Island's increased sales of rum to the States were reflected in a gain of 22 per cent in the amount of paper boxes and cartons purchased during the year. Shipments totalled 1,330,000 pounds, with a value of $72,100.

Mill agents are optimistic over the prospects for the present year, as has been indicated, and look for increased sales of all kinds of paper during 1937.

Titanium Pigmented Papers*

WILLIAM R. WILLETS
Paper Development Laboratory
Titanium Pigment Corporation

RECENTLY the following was published in a Washington, D. C. newspaper as part of a news item regarding the discovery by astronomers of a vast cloud of titanium in supposedly empty celestial space. The article was headlined "Vast Cloud of Titanium Found: One of Rarest Basic Substances" and went on to say that "Titanium is one of the rarest of the 92 basic substances of which the universe is composed in its distribution on earth. It has a very limited use—one of the chief being as pigment in false teeth."

This news item was of particular interest to us because the above quotations are so completely erroneous. Instead of being one of the rarest substances, titanium is one of the most common, being the ninth in the order of abundance. There is more titanium in the earth's crust than the combined amounts of lead, zinc, antimony, tin and copper, and these elements are considered as extremely abundant. Instead of having a very limited use for false teeth, titanium finds wide application in alloys, mordants, bleaching agents, textile strippers, refractory materials (glazes, enamels, glasses and bricks), and pigments, to mention but a few.

Of these, the pigment field is by far the largest. Titanium dioxide and composite pigments made with titanium dioxide are used wherever white, bright, opaque pigments are required and among such applications might be mentioned paints and enamels of all kinds, inks, white and bright colored rubber and leather products, rayon, textile finishes, cosmetics, linoleum, oilcloth, and paper, in which last we are naturally most interested.

The extreme inaccuracy of the newspaper quotations given above is therefore evident. Instead of having a limited field of application, titanium dioxide, and composite pigments in which it is a constituent, are among the most important, and likewise among the most common, of all the white pigments in use today.

The three titanium pigments most commonly used in the paper industry are titanium dioxide (*Titanox-A*); a pigment comprising 30 per cent titanium dioxide precipitated on and coalesced with 70 per cent precipitated barium sulphate (*Titanox B-30*), and a pigment comprising 30 per cent titanium dioxide precipitated on and coalesced with 70 per cent calcium sulphate (*Titanox-C*). Titanium dioxide is by far the most opaque of all the white pigments, but the other two are also vastly superior to the fillers commonly used in the manufacture of paper. All of these pigments are exceptionally white and bright, have uniformly fine particle size, and are chemically inert. They are readily adaptable to papermaking processes, as has been shown by their wide adoption by the paper industry.

The manufacture of titanium pigments and the various ways by which they are applied to paper have been discussed at considerable length during the last three years in the technical literature of the United States and foreign countries so there is no point in repeating such information herein, since we are most directly interested in the properties and use of pigmented papers.

Properties of Titanium Pigmented Papers

Probably the most important characteristic which titanium pigments impart to paper is that of opacity. Because of their high refractive index, brightness and small particle size, opacity is obtained with only small amounts of pigment. For example, it requires about ten times as much of the ordinary fillers to produce a given opacity as of titanium dioxide. For this reason, it is possible to attain ranges of opacity with titanium pigments absolutely unapproachable with the older types of fillers.

A few examples will suffice to indicate the high opacity-giving qualities of titanium pigments.

A 16-pound rag content bond had an opacity of 74 per cent; the presence of 3.8 per cent titanium dioxide increased this to 86 per cent. A similar 20-pound unpigmented sheet had an opacity of 82 per cent (considerably lower than for the pigmented 16 pound sheet); here 4 per cent titanium dioxide increased the opacity to 93 per cent. At the same time, "show-through" was greatly reduced, and the color and printing surface improved.

In all-sulphite paper, made under rigorously controlled conditions, it was found that the opacity increased approximately as follows:—

Basis Weight (25x38—500)

40 Pound		50 Pound		60 Pound	
% TiO_2	% Opacity	% TiO_2	% Opacity	% TiO_2	% Opacity
0	75	0	79	0	85
1.3	82	1.3	88	1.3	91
3.0	85	3.0	91	3.0	93
3.6	88	3.9	92	3.9	95

The "show-through" after printing was greatly reduced, and the brightness and color improved very materially.

In 50 pound (25x38—500) paper made from a 50-50 fixture of bleached sulphite and soda pulp without

(*) This article was presented at a meeting of the Salesmen's Association of the Paper Industry, Hotel Lexington, New York City, January 25, 1937.

filler, and loaded with clay, titanium dioxide (*Titanox-A*) and titanium barium pigment (*Titanox B-30*), it was clearly demonstrated that the titanium pigments outclassed the clay in improving opacity, brightness and whiteness, the following results being obtained:—

Filler Content:	Per cent Opacity	Per cent Brightness
None	83	82.8
3.0% Titanox-A	91.4	86.0
6.5% Titanox B-30	90.0	86.1
10% Clay	88.4	84.3

These figures demonstrate that degrees of opacity and brightness are readily obtained by titanium pigments, unattainable with any reasonable amounts of the older fillers.

Not only do titanium pigments impart a good white color to paper, but they also minimize after-yellowing. Paper yellows because of chemical changes occurring in the fiber, sizing, etc. No such chemical changes occur in the pigments, which are stable. Therefore because of their high opacity, brightness and color, they mask the changes occurring in the other constituents of the sheet.

Titanium pigments also improve printing qualities. Because of their small, uniform particle size, they give an excellent surface. Likewise the opacity, brightness and whiteness resulting from titanium pigments result in very effective contrast between the ink and the paper.

Because only small amounts of titanium pigments are needed to produce the desired results, the strength, bulk, sizing, etc., of the paper are little affected. Evidence has been advanced showing that titanium dioxide has less effect on sizing than clay, in other words, sheets loaded with titanium dioxide had much higher sizing than sheets loaded with an equal amount of clay. (Cf. Pulp and Paper Magazine of Canada, November, 1936, P. 688-689).

Use of Titanium Pigmented Papers

A recent article by Peede in *Paper and Paper Products* listed about thirty different uses for which paper manufacturers recommend opacified papers and at that, the list only covered what might be considered as "bond-type" papers. Actually it is impossible to prepare any such list, as new types of paper are continually being developed by the aid of titanium pigments, and new uses being found for already existent papers.

Among the most interesting types, recently developed by means of titanium pigments, are the various "all-purpose" opacified sheets, with which the ultimate consumer is already becoming very familiar. These papers are usually stocked in the standard finishes, in weights corresponding to from 16 to 20 pounds (17x22—500). Because of their extremely high opacity, color and brightness, they are widely used for annual reports, booklets of all kinds (including catalogues, house organs, financial prospectuses, etc.) broadsides, calendars, maps, circulars and all types of advertising matter.

Rather similar to these "all-purpose" or "general use" sheets are the many opacified bonds and ledgers, which are receiving wide approval from the trade. Bond papers are used for many purposes, too numerous to list, so only a few notes will be made herein. We find this type (especially in the permanent rag, or semi-rag, aspect) being widely used for the printing of bonds, stock certificates, insurance policies, documents of all kinds, etc., where good color, high opacity and generally good appearance is needed, coupled with strength and permanence. All of these properties can be obtained by the use of titanium pigments because of their opacity, whiteness, brightness and chemical stability, and also because such small amounts are needed to produce good effects that strength is little affected.

A great deal of bond paper is also used for the printing of advertising booklets, financial prospectuses, etc., and here, because of the necessity for excellent appearance, good opacity and little "show-through," titanium pigmented papers are fulfilling an important need. Even though letterheads are rarely typed or written on both sides, the fine appearance of a pigmented sheet has definite advertising value when used for this purpose. The advisability of using a highly opaque, thin, lightweight sheet for correspondence, etc., to be sent by air mail is so evident that it need only be mentioned in passing.

Likewise the necessity for high opacity envelope papers is self-evident. Many envelopes in the past have had such poor opacity that their contents were readily visible. Titanium pigmented papers have the requisite strength, since only small amounts are needed to produce effective opacity.

High opacity and lack of "show-through" are absolutely essential for a satisfactory book paper. This is especially true of the thin papers used for printing Bibles, encyclopedias, dictionaries, textbooks and the "One Volume Editions" of the classics and long novels now so much in vogue, and in fact wherever compactness is desired without the sacrifice of color and opacity. It may seem a little far fetched, but a number of people have commented that the reason they did not read the Bible and the classics, and did not consult encyclopedias and textbooks more frequently, was because of the eye strain involved. Such eye strain results from lack of opacity and from printing showing through from the other side, preventing the desirable contrast between the printed words and their background. While a certain degree of opacity may be obtained from the use of the older fillers, these have little effect on "show-through" because the refractive index of these older fillers is so close to the refractive index of the printing ink vehicle, that when the vehicle penetrates the paper, it renders it transparent beneath the printed letter, allowing that letter to show-through on the other side.

Because of the transparency of magazine paper, an advertiser of a quality product has frequently been placed in the embarrassing position of having a fly-swatter, or some such article, show through from the other side of the page, spoiling the effect of his own advertisement, if not actually holding it up to ridicule. At the same time, because of the lack of opacity and the presence of "show-through," it is exceedingly difficult to read some magazines because of the eye strain involved. The use of titanium pigmented papers having high opacity, brightness, etc., prevents such difficulties.

The same general comments may be made concerning

catalogues, which are usually printed on a fairly cheap grade of book paper, frequently containing ground wood. Titanium pigments are used here to produce opacity and to prevent discoloration. At the same time, it is frequently possible to decrease the weight of the paper used without loss of desired opacity, effecting a saving in mailing and shipping costs.

Offset papers are usually fairly heavy in weight and so have higher opacity than the usual run of book and bond papers. However, there are many cases even here where increased opacity is a distinct advantage. This increased opacity is logically obtained by the use of titanium pigments, which also give a good white and bright surface, resulting in attractive and effective contrast between the background and the printing. What has been noted for offset applies equally well to cover papers.

At first consideration, it may seem odd to use an opaque white pigment in colored papers. This is done not only to improve opacity and to prevent show-through, but also to brighten up the sheet and thus give a more attractive appearance. When titanium pigments are used in colored papers the result is a bright attractive color rather than a dull one.

White opaque waxed paper made using titanium pigments is so common today that it need be mentioned only in passing. At the same time, it may not be so evident that titanium pigments are being widely used in the manufacture of lined boards, especially where these boards are to be waxed or oiled for the packaging of food stuffs; butter, oleomargarine, bacon, etc. As a matter of fact, titanium pigments are being used to a large extent to improve the appearance of all types of board. When titanium pigments are used for this purpose, it is frequently possible to decrease the weight of the top liner, or to use a less expensive stock in the top liner. Because of the high opacity of titanium pigments, their use in the liner of a board prevents the dull, poor-colored middle from showing through and dulling the appearance of the surface.

Generally speaking, coated papers are of sufficiently high weight that opacity may not be considered as a factor, but it is true that many of the lighter weight coated sheets are sadly deficient in this property. Lack of opacity and brightness is frequently overcome by incorporating titanium pigments in the coating mix. There are at present also a number of sheets on the market, called by various names, which are coated on the paper machine. Generally, when using a groundwood raw stock, it is necessary to use titanium pigments in the coating mix to mask the poor color of the raw stock and prevent discoloration. These machine coated sheets are finding increasing use and it is to be expected that such use is still in the early stages and will continue to expand rapidly.

Cost Considerations

The only real objection to the use of titanium pigments in paper is their cost. Yet, when considered as a part of the total cost of a pamphlet, broadside, book, etc., the cost of the paper is a rather minor item.

For example, in the cost of printing an eight-page broadside by letterpress on a 20-pound map bond costing 20 cents a pound, the actual cost of the paper was only from about 5 to 16 per cent (depending on the number of copies run) of the total, the balance being accounted for by art work, plates, etc. If a 20-pound pigmented sheet were used, the increase in cost would only be from 0.4 to 0.65 per cent, a very small increase when the advertising advantages of a pigmented sheet are considered.

However, in the particular job in mind, it would be feasible to use a 16-pound pigmented sheet since such a sheet would have an opacity at least equal to, and probably better than, the 20-pound unpigmented sheet, and so an actual saving would be effected because of the saving in paper tonnage. Such savings would increase with the number of copies made, but would be over 1 per cent for 1,000 copies and over 4.5 per cent for 4,000 copies. The accompanying table which is

Printing Costs—8-Page Broadside

Fixed Charges:	1M	2M	3M	4M
Art and Photos	$ 44.00	$ 44.00	$ 44.00	$ 44.00
Plates	49.00	49.00	49.00	49.00
Printing	33.60	39.45	45.30	51.15
Office Alterations	7.50	7.50	7.50	7.50
Agency Charges	21.38	23.51	25.65	27.79
Total	$155.48	$163.46	$171.45	$179.44
Cost of 20# unpigmented paper at 20c a pound	$8.40	$16.80	$25.20	$33.60
Grand Total	$163.88	$180.26	$196.25	$213.04
Percent Cost of Paper	4.96	9.22	12.82	15.75
Cost of 20# pigmented paper at 21c a pound	$8.82	$17.64	$26.46	$35.28
Grand Total	$164.30	$181.10	$197.91	$214.72
Percent Cost of Paper	5.36	9.75	13.38	16.42
Percent increase in cost using pigmented 20# paper, over unpigmented 20# paper	0.40	0.53	0.56	0.65
Cost of 16# pigmented paper at 21c a pound	$6.63	$13.32	$19.89	$25.52
Grand Total	$162.11	$176.78	$191.34	$204.96
Savings by using 16# pigmented paper over 20# unpigmented paper Dollars	$1.77	$3.48	$6.57	$9.76
Percent	1.08	1.93	3.35	4.57

based on an actual printer's estimate, gives the details.

Similarly, in substituting a 50-pound pigmented offset sheet for a similar weight unpigmented sheet on a four-page, two-color letter folder, the increase in cost was found to vary from 0.03 to 0.27 per cent, an almost negligible amount.

It has been estimated that the labor cost of sending out an invoice is about 28 cents, this figure including printing of the form, typing, etc. Assuming an 8½x11-inch 20-pound bond sheet at 10 cents a pound, the paper cost would only be 8/100 cents, or about 0.3 per cent of the total. Even if the price of the paper were increased 10 per cent by pigmentation, the added cost would only increase the total 0.03 per cent, a negligible amount.

The paper (30 pounds, 25x38—500) in a typical engineering handbook was found to weigh one pound. Unfortunately, this paper is transparent, which makes the use of the handbook difficult. While the cost of manufacture is not known, the handbook sells for $5, so the actual percentage increase in using a pigmented paper (assuming a high pigmentation) would be less than ½ per cent of the selling cost, inconsiderable when the advantages are considered.

Similar deductions would apply to practically every volume published today, and especially to "thin-paper" editions. Furthermore, the possibility of substituting a lighter weight pigmented paper, for a heavier unpigmented sheet, cannot be overlooked.

The above examples might be multiplied, almost without end, but they suffice to bring out two points; first that the cost of the paper is a small item when figured on the total cost of doing a printing job; and second, that real savings may frequently be effected by substituting a lighter weight pigmented paper for a heavier weight unpigmented paper, because, although the cost per pound of the former is greater, the actual cost per unit is less. In addition, there are also savings to be gained by the decreased shipping weight resulting from the use of light weight, pigmented paper.

The value of titanium pigmented papers is becoming recognized not only by the paper industry but by the ultimate consumer as well, as evidenced by the appearance of articles such as Mr. Peede's. In fact, a recent advertising survey noted that of the five industries investigated, the paper industry was probably the most pigment conscious and that executives, operators and salesmen knew what titanium was and what it should be used for. Quite probably the ultimate consumer is less familiar with the facts but he, too, is approaching the point of appreciation of titanium pigmented papers. For years, advertising groups, printers, publishers and others have been complaining about the lack of opacity, brightness and color of the papers which they were using. It is now possible to overcome their objections by supplying papers properly pigmented with titanium pigments. Naturally, in some cases these will cost a little more but in other cases, the use of such sheets may actually effect savings. It is only necessary to educate the ultimate consumer regarding the specific paper best suited for his individual job.

Methods of Determining Gloss

FOR those who are interested in gloss as it affects the appearance of different materials, a paper in the January number of the *National Bureau of Standards Journal of Research* (RP958) by Richard S. Hunter will be of interest because it brings together much of the available information based upon gloss and discusses certain phases of the subject which have not heretofore received attention.

Glossiness is a characteristic common to many materials encountered in everyday life and is caused by surface reflection. Because surfaces are of so many types structurally, many kinds of glossy appearances are possible. The fundamental physical basis for describing the gloss of surfaces is provided by functions which describe the directional distributions of light reflected by these surfaces. However, such distribution functions are quite complex and, although they supply much more information about the reflectance properties of surfaces than do gloss determinations which give individual, arbitrary gloss values, they do not provide a practical means for the routine examination of the gloss of products in industry and commerce. What are desired for "practical" measurements of gloss are instruments which give a single value of gloss for each surface measured.

If one studies the different types of glossy appearance, or if one examines the different instruments which are used to measure gloss, he discovers that there are several types of gloss. Six types of gloss have so far been described. They are: (1) specular gloss (shininess); (2) sheen (shininess at grazing angles); (3) contrast gloss (contrasts between high-light area and nonhigh-light areas); (4) absence-of-bloom gloss (bloom is the reflection haze adjacent to reflected high lights); (5) distinctness-of-reflected-image gloss; and (6) surface smoothness (absence-of-surface texture). Materials which are graded for gloss are usually evaluated in terms of one or another of these types of gloss. When one grades a series of samples for gloss, he unconsciously searches out and uses the appearance characteristic in which the differences are most noticeable. The six types of gloss identify six of these appearance characteristics.

The applicability of any instrument to a given gloss problem is best determined by actual trial in which comparisons are made between visual estimates of gloss and results obtained with the trial instrument on samples typical of the materials to be measured. Specular gloss measurements are most useful in the medium-gloss range, and measurements of distinctness-of-reflected-image gloss on samples in the high-gloss range. Instruments have not as yet been developed to measure bloom. Surface texture is best recorded by actual photographs of surfaces in specularly reflected light.

In the paper, a number of gloss instruments are described and a bibliography is included which lists most of the previous publications on the subject.

Technical Control in the Groundwood Mill

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UNIFORM quality is a necessary requisite in the manufacture of groundwood pulp. This quality can only be maintained by technical control, supervised by a technical director capable of organizing a fully trained personnel. His assistants should thoroughly know the equipment and processes in their own mill and be able to correlate laboratory data with actual mill operations.

A most important phase in any type of mill control is to gain the confidence of the mill operators. This confidence can be quickly established if the laboratory can definitely show how to improve the product, and can appreciate the many variables present in grinding pulp with which the mill men have to contend. After compilation of laboratory data, the technical man can demonstrate its importance to the mill operators and how it is applicable to mill operation. If technicians and practical men earnestly co-operate with each other, a long stride has been taken towards successful control of groundwood pulp.

Not so many years ago, the groundwood superintendent demanded the maximum production from his grinder units, with little consideration of quality; this policy is still maintained in a great many mills, largely through lack of confidence in technical men and their possibilities. If the technical man would endeavor to create interest and desire by helping to educate the practical man in technical problems, the feeling of animosity between the two groups would soon be dispelled.

The first step in establishing pulp control is to have a fully equipped laboratory to enable the technical men to make a complete study of varying stock conditions throughout the mill. This study should include every process from the raw materials to the wet end of the paper machine. Uniform groundwood supplied to the paper mill will eliminate many of the pulp variables connected with the manufacture of paper. The average newsprint mill uses eighty to ninety per cent groundwood for furnish. Is it unreasonable to assume that variations in quality of these high percentages account for a great many troubles in the paper mill? Any mill using such a large proportion of this pulp should attempt to control as much as possible this most important part of the furnish.

The elimination of the human element in manufacture of groundwood pulp is a step nearer to uniformity. This can be partly accomplished by having automatic temperature and pressure controls on the grinders. These controls prevent sudden fluctuations in temperatures and pressures which are so detrimental to the grindstones.

The first problem to investigate is the various types of burrs used. Contrary to universal belief, a set of burrs used at one mill cannot be applied to another mill, due to differences in the wood supply, type of stones used, and grinders themselves. The laboratory should set up a theoretical groundwood strength for grinder pit stock and at the same time maintain necessary production at low power consumption. By experimenting with different types of burrs and making exhaustive tests, data can be compiled to show what type of burr would be best suited for any particular mill. Along with this investigation of burrs, variations in the stones regarding grit and hardness, and the resulting quality from each stone can be carefully studied.

The lengthening of the burring cycle cannot be stressed too much. It is a known fact that a freshly dressed stone gives the most production and a weak free pulp; a stone that is beginning to dull gives a strong slow pulp and low production. By a series of tests, a set of burrs and the method of their application to the face of the stone can be adopted to lower the spread of the strength of pulp before and after burring and lengthen the burring cycle twenty to thirty per cent, thus increasing the life of the stone and giving a strong pulp for a longer period. By staggering the burring time of the various stones there is no noticeable influx of weak pulp from a freshly burred stone.

In conjunction with the investigation of burrs, consistencies in the grinder pits, temperatures of the stock and grinding pressures should be investigated. By purposely raising and lowering these factors, ideal grinding conditions can be adopted and these standards placed in the hands of the pulp mill operators. By working with them the technical men can readily show them how slight changes of any of these variables affect the quality of the stock. At the start of technical work, problems should be selected that will give tangible results and thereby gain the co-operation of the mill men, which is so necessary for the success of the laboratory.

FORM A

Date & Time Sampled	Stone No.	Service of Stone Since Last Burring Hrs.	Temp. of	Speed of Stone RPM	Lbs. Press.	HP Per Ton	% BD. Cons.	Freeness CCs.	Strength	Remarks: Type of Burrs, Stone, Grit, etc.

Form A is recommended for grinder control. Routine tests can be established at the discretion of the technical director. These tests should be made often enough to enable the mill men to keep a close check on each individual stone.

Burring cycles should be followed closely, starting with a sample taken before burring, immediately after burring, and periodic sampling until the cycle is completed. This data will show how quickly satisfactory

pulp can be made, and over how long a period it can be maintained at definite operating conditions.

The accompanying graphs show what can be accomplished by technical control. Figure No. 1 illustrates the tests made of a burring cycle without any type of control. A sample was taken before and after burring and at each twenty hour period thereafter. Figure No. 2 illustrates a curve based on technical control of a burring cycle. Temperature, consistency and pressure

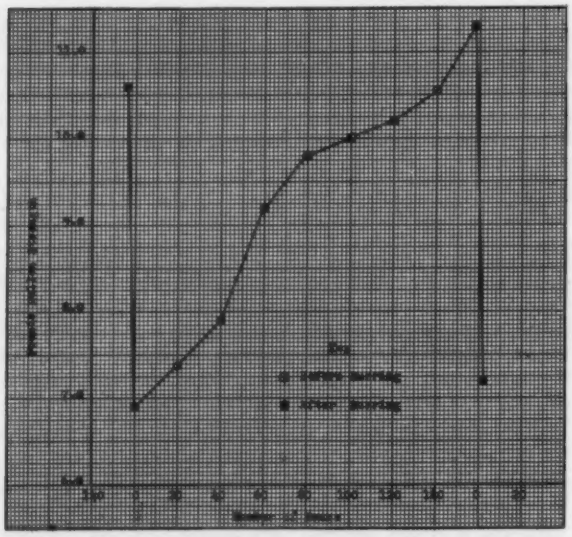

Fig. 1—Curve showing burring cycle without technical control

were maintained uniform throughout this test. The burrs were applied to the face of the stone in a standardized method. Samples were taken in the same manner as in Figure No. 1. On analyzing these two curves we find in Figure No. 2 the drop in strength after burring was appreciably less than in Figure No. 1. Strong pulp was developed almost instantly and the burring cycle was considerably lengthened. Satisfactory production was maintained in both cases with no increase in horsepower. Increasing the strength of groundwood will enable the paper mill superintendent to make a definite decrease in the sulphite content of the furnish. In some mills, with pulp control, a tremendous saving in cost per ton can be made by reducing the sulphite percentage used and substituting groundwood which is a far cheaper grade of pulp.

White water to the grinder room should be systematically sampled for consistencies and temperatures. It is a better policy to use fresh water on the stones, as white water tends to glaze them, thus cutting down their efficiency. Surplus white water can be used elsewhere as make-up water.

At the technical director's leisure, he should make a comprehensive study of the wood conditions in his own plant. Tests made periodically for moisture, specific gravity, yield per cord and per cent resins are of great value to the management, forestry department and the laboratory. Charts can eventually be plotted correlating wood data with actual pulp tests, showing the relationship between different types of wood and ultimate pulp quality.

At the bull screens tests should be made to determine the percentage of rejections and volume of white water at a known consistency necessary to thin the stock for further processing.

The knotters, fine screens and tailing screens should be tested frequently for consistency. Each individual screen has its own ideal operating consistency so that close control at the screens is imperative for uniform screening. An ordinary hand-driven centrifuge is acceptable for making spot consistency tests. A chart showing centrifuge readings and corresponding consistency percentages can be posted in various parts of the pulp mill. The operation of the centrifuge is relatively simple and can be quickly taught to the screen men, so that they may use the tester themselves for control work. By placing enough confidence in the mill men to keep the consistencies uniform, a closer relationship will exist between the laboratory and mill operators.

At each individual screen, sheets can be made to determine percentages of dirt and slivers present in the pulp. These sheets should be made on a standard sheet mould at 0.1 per cent bone dry consistency. A satisfactory procedure for a dirt and sliver count is to place a single sheet over an indirect light and mask out a part of the sheet, leaving a known area exposed to view. In this known area the exact number of dirt particles and slivers present should be counted. By a series of tests each mill may adopt its own standards for this type of test. Form B can be used for control at the screens.

The supply to the deckers and wet presses should be tested frequently. Both types of these machines should be controlled for thickening efficiency. This may be done by keeping the consistency uniform and the stock maintained at the ideal height in the vats. A satisfactory consistency is between the ranges of 0.4 per cent to 0.5 per cent. White water from these units should be tested for consistency to determine volume of stock

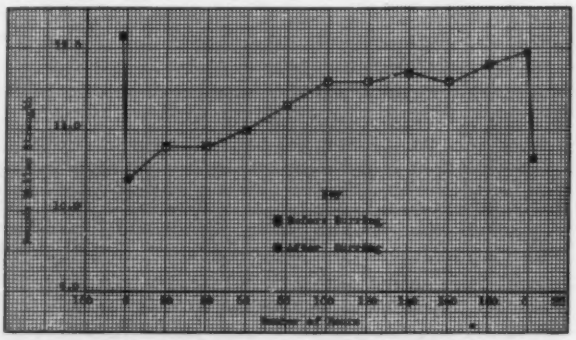

Fig. 2—Curve showing burring cycle with technical control

retained on the cylinder moulds. Some mills use a chrome plated or Monel metal wire in preference to the copper or bronze cylinder wire; this is particularly true when a mill uses chemicals in the system. These wires have a much longer life and consequently reduce operating costs.

A routine check should be made at the stock regulators for consistency, freeness and strength. This is important, as regulated stock is sent to the mixing system where it is combined with the rest of the furnish.

Various stock chests throughout the mill should be

sampled each day for consistencies and volumes noted. These figures can be supplied to the office for the purpose of calculating pulp consumption per day.

A careful check of jordan operation may be made by using Form C.

Pulp control should extend beyond the pulp mill into the paper mill. There are an unlimited number of tests that can be made at this section of paper mill operation. Consistency, freeness and strength tests should be made at the proper machine head-box. At the same time the

FORM B

STOCK AND WATER CONSISTENCIES						
Date & Time Sampled	First Screens	Second Screens	Riffiers	White Water	Dirt Count	Sliver Count

temperature and height of the pond should be noted, as these two factors play an important part in proper drainage on the wire. Along with strength testing at the head-box, the finished sheet should be tested. The two samples should check very closely for physical strength if the stock is handled properly on the paper machine. Form D can be used for paper machine data.

With this type of information available, the technical man can very quickly convince the paper mill superintendent that control of the variables at the wet end of the paper machine will give him better machine performance and an improved sheet at the dry end.

Drainage qualities of the wire and table rolls can be analyzed over what is termed a formation box. This box is of ordinary wood construction containing a series of lights placed under a frosted glass. A known area of paper is exposed over the light and the formation carefully scrutinized. Any variation in formation should be immediately called to the attention of the paper mill superintendent. Each mill can adopt its own standards for this test by establishing an ideal formation figure at 100 per cent and using numerical percentages for comparative purposes.

Moisture tests should be made at the different presses.

FORM C

Date & Time Sampled	Jordan Setting	Motor Amps.	Temp. °C	Consistency % BD	Freeness CCs.	Acidity pH	Remarks

A good practical method of sampling is to purposely break the web after it has passed through the press to be tested, and let the sheet pile up on the doctor board. A sample should be extracted from the middle of the pulp mass and placed in an air-tight container. As much care as possible should be exercised so that the sample will be truly representative and the moisture content undisturbed. These samples should be taken at regular intervals across the machine. This type of test should be made when changes occur, such as renewing felts or varying the pressure on the press rolls.

White water usage throughout the mill should be carefully studied. At the white water exits, weirs and automatic samplers should be installed to enable the laboratory to check the daily losses. Flow diagrams of white water and stock lines should be made and placed in the hands of all the operating superintendents. White water contains a small percentage of pulp fines and should therefore be used as make-up water wherever possible. White water save-alls should be checked frequently for efficiency.

The technical men should have complete jurisdiction of all testing apparata. This apparata needs periodic cleaning and adjustment, as instruments that are not frequently calibrated will give unreliable results. Inexperienced operators should not be permitted to come in contact with this equipment. If possible, all physical tests of pulp and paper should be made in a constant humidity room, controlled at a standard temperature.

The technicians should never resort to subterfuge in dealing with mill operators. This practice, when eventually discovered, leads to distrust and imparts the impression to the mill men that the laboratory is being used to check their efforts. To alleviate any suspicion on the part of the mill men, the technical director should post in the laboratory for general perusal a chart showing the results of tests made. A copy of each report should be distributed to the various superintendents for their own files.

There are numerous tests that can be made through-

FORM D

Date & Time Sampled	Pond Ht. Inches	Pond °F	Temp.	Consistency % BD	Freeness CCs.	Strength	WW pH	Remarks

out a paper mill. The technical director should make use of his own experience and common sense in adopting a control program. The tests cited in the preceding paragraphs have been adopted for control purposes in one particular mill, but there are many other tests that can supplant those outlined in this article. Each mill has its own problems to be solved and the technical department should act accordingly. The manager of manufacture and mill superintendents should bring their problems and suggestions to the technical men and harmoniously co-operate with them. If the management displays complete confidence in the control laboratory, the mill men will soon follow suit.

Coordinated control in any mill will undoubtedly bring results. The quality of the paper manufactured will show a marked improvement which should bring about an increase in sales and satisfied customers. The operating conditions in the mill will be more uniform with a subsequent increase in paper production.

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Get the Proper Balance

But for two things, you are the same today as on your birthday. Heart, lungs, liver, feet, arms, all the same. Nothing changes save your mind, and that only because of two things:

The men you have met—
The books you have read.

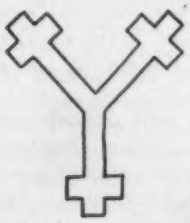
There is a thought for the thinking man.

Paper Sketches ---

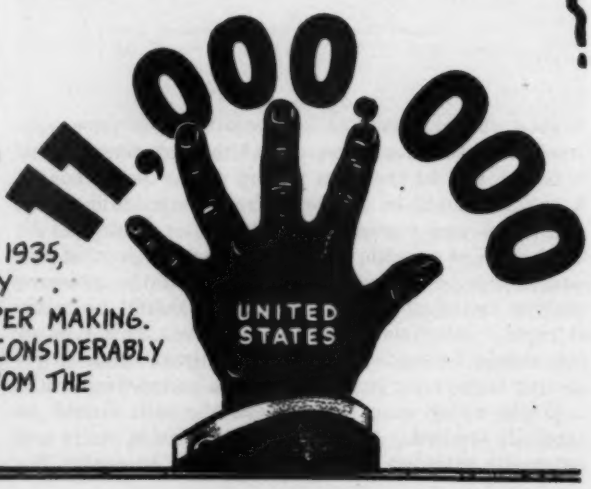
PAPYRUS WAS SO ABUNDANT DURING EARLY ROMAN DAYS THAT AN INFERIOR QUALITY PRODUCT, CALLED "AMPHITHEATRICA," WAS AVAILABLE FOR USE IN MAKING UP "PLAYBILLS," AND A STILL COARSER GRADE, CALLED "EMPORETICA," COULD BE OBTAINED BY MERCHANTS FOR USE IN WRAPPING UP PARCELS.

UNREASONABLE WAGES DEMANDED BY THE ENGLISH CRAFTSMEN WHO HAND-MODELED THE DELICATE STUCCO DECORATIONS USED IN 17TH AND 18TH CENTURY BUILDINGS, EVENTUALLY BROUGHT ABOUT THE DEVELOPMENT OF EASILY-MOULDED PAPIER-MÂCHÈ FOR USE IN MAKING INTRICATELY DESIGNED PANELS, CORNICES, COLUMNS, AND OTHER ARCHITECTURAL ADORNMENTS. IT IS SAID THAT THE EARLY MODELERS OF PLASTER ORNAMENTS CAME TO WORK GIRT WITH SWORDS AND WITH THEIR WRISTS ADORNED WITH LACE RUFFLES.

MANY OF THE WATER-MARKS FOUND IN PAPER MADE DURING THE MIDDLE AGES APPEAR TO HAVE BEEN RELIGIOUS SYMBOLS. AMONG THE MARKS SO CLASSIFIED ARE THE GLOBE AND CROSS, THE UNICORNS, THE ANGELS, THE JACOB'S LADDER, AND MANY OTHER.



MORE THAN 11,000,000 POUNDS OF OLD MANILA ROPE WERE IMPORTED INTO THE UNITED STATES DURING 1935, ACCORDING TO PRELIMINARY ESTIMATES, FOR USE IN PAPER MAKING. OF THIS TOTAL QUANTITY, CONSIDERABLY MORE THAN 50% CAME FROM THE UNITED KINGDOM.



A. P. P. A. Holds Sixtieth Annual Meeting

DEVELOPING an atmosphere of genuine enthusiasm as an outcome of the marked improvement in business generally and the very appreciable expansion in demand for and production of paper and pulp in recent months, the sixtieth annual convention of the American Paper and Pulp Association and affiliated organizations, held in the Waldorf-Astoria Hotel, New York City, February 22 to 26, inclusive, was highly successful. The attendance at this year's gathering of paper manufacturers, converters, merchants, distributors and suppliers was particularly large. In fact, although there is no definite way of determining as no statistics on the matter are compiled, it was the consensus of opinion at the convention that a new high record of attendance was established; certainly it has been many years, if ever before, since so many paper company executives and representatives flocked to New York for the annual trade meetings.

D. C. Everest, vice president and general manager of the Marathon Paper Mills Company, Rothschild, Wis., was elected president of the American Paper and Pulp Association, succeeding Frank J. Sensenbrenner, president of the Kimberly-Clark Corporation, Neenah, Wis., who had served two annual terms as chief executive of the parent body. This is the second tenure of office as president for Mr. Everest, he having been head of the Association for a term of two years a few years ago. The following A.P.P.A. vice presidents were elected for 1937:

Hugh J. Chisholm, Oxford Paper Company, New York City.

Stuart B. Copeland, Northwest Paper Company, Brainerd, Minn.

Richard J. Cullen, International Paper Company, New York City.

A. C. Goodyear, Bogalusa Paper Company, Bogalusa, La.

Ralph A. Hayward, Kalamazoo Vegetable Parchment Company, Parchment, Mich.

H. L. Jenkins, George O. Jenkins Company, Bridgewater, Mass.

John R. Miller, West Virginia Pulp and Paper Company, New York City.

Z. W. Ranck, Crystal Tissue Company, Middletown, O.

John L. Riegel, Riegel Paper Corporation, New York City.

Frank J. Sensenbrenner, Kimberly-Clark Corporation, Neenah, Wis.

Norman W. Wilson, Hammermill Paper Company, Erie, Pa.

Sidney L. Willson, American Writing Paper Company, Inc., Holyoke, Mass.

J. D. Zellerbach, Crown Willamette Paper Company, San Francisco, Cal.

Reverting to the program customary prior to a year ago, the open general meeting of the American Paper and Pulp Association was held on Thursday afternoon of Convention Week, following the sessions of the various divisional groups. The general meeting was in the Jade Room of the Waldorf-Astoria, and was well attended, as was the case with nearly all of the numerous group sessions throughout the convention.

President Sensenbrenner presided at the general A.P.P.A. meeting, assisted by Executive Secretary Charles W. Boyce. In his annual address, which he entitled "Recovery and Its Problems in the Paper and Pulp Industry," President Sensenbrenner stated that American industry has at last responded to the influences of economic revival, that a broad period of prosperity seems to lie ahead, and that the opportunity for the paper and pulp industry to share fully in this prosperity seems clearly defined. Mr. Sensenbrenner continued as follows:

The President's Address

"Last year the consumption of paper in the United States arose to a record level. It required a greater production than ever before in the history of the industry. Late in the year the prices of most grades responded to the greater demand. In 1936 the industry achieved a large measure of recovery.

"The changes that have taken place since 1932, the bottom of the depression, are impressive. For instance, paper production has increased 46 per cent compared with the low; average mill realization on all grades of paper, including paperboard has risen 17 per cent; employment has increased 26 per cent; hourly wage rates exceed all former marks and the periodic earnings of our workers are steadily increasing. These are all important steps in the recovery process. There are others, however, that must yet be taken before recovery is complete. Important among these is the reconstruction of the industry's resources and the restoration of its earnings.

"During the depression most companies heavily curtailed their improvement programs resulting in a serious deterioration of the industry's production facilities. Although many improvements have been made in the past eighteen months, there is still much to be accomplished.

"The industry's earnings have not yet reached the levels that are essential to continued welfare, although they have shown some improvement. It is reasonable to expect, however, that the high consumption rate will eventually, if not speedily, take care of this situation.

D. C. EVEREST
The Association's New President

Steps in Recovery

"The order with which the steps in recovery occurred is particularly significant. Excepting the flurry in sales in 1933 that halted downward price tendencies and in some grades resulted in price increases, the industry first increased its employment and its wage rates when it adopted its code of fair competition. Throughout a period of nearly eighteen months thereafter these increases were sustained despite operating rates that at times sank below 60 per cent of capacity. Prices which were in many cases close to or below the cost line did not respond until near the end of the third year of recovery. In the meantime, the industry was forced to draw from its reserves to finance not only its greater labor costs, but also the improvement of its properties. Rebuilding of resources and restoration of earnings were not generally possible until prices began to move upward.

Recovery Program Depended Upon Co-operation

"This order, largely dictated by the provisions of the National Industrial Recovery Act, was exceedingly difficult to maintain. In this vast experiment in managed economy many economic laws were given little thought or were completely disregarded. Fixed arbitrary standards could be maintained only because the will to maintain them existed and because the members of the industry strove honestly and whole-heartedly

to control the elements that create downward pressures in order that it might assist in the recovery program.

"For instance, restriction of working hours and the establishment of minimum wage rates greatly increased labor costs at a period when neither production nor prices permitted equal increase in income. In fact production was at the level during most of this period that under other circumstances would never have permitted such restrictions. Yet, the industry avoided epidemics of wage cutting, reduction in employment, and destructive marketing. This measures the effectiveness of group action when the individual will to achieve a common goal is firmly fixed.

Code Regulation

"Opinion in respect to the NRA varies widely. In our thinking of that period it is important that we clearly distinguish between the Act and its administration. Industry quite generally seems to view with favor the business principles laid down in the National Industrial Recovery Act itself.

"In common with all others, the paper and pulp industry had difficulties in code administration. Even though these difficulties constituted a tremendous handicap, the administrative agencies of the industry itself had by the end of the NRA period reached a high degree of real efficiency. When the compliance provisions of the NRA failed to meet the promises of the Act, the industry and its administrative agencies refused to confess failure because forsooth there could be no dependence upon a governmental police force. This attitude prepared the industry to carry on after the Supreme Court's decision in the Schechter case.

"The industry was fortunate at the beginning of the code period in being able to establish a sound integrated organization structure. It was particularly fortunate—and upon this our measure of success in code administration largely depended—upon having men who were willing to give their time to the solution of industry problems. To these men I shall always feel grateful, they deserve the highest respect of the industry.

"In looking forward into the future we cannot fail to recognize the proven value of organization work and the habits of co-operation that have grown from this work. We must preserve these assets.

Paper Consumption Is Increasing

"The immediate business prospects appear exceptionally bright. The recent reaction of prices to the rising demand gives assurance that increased costs of manufacture will be covered and that the industry once again has the opportunity to attain a position of reasonable operating profit. The consumption of paper gives no evidence at this time of slackening its rate of increase, despite the fact that eventually slowing up is inevitable. Business uncertainties—the general labor situation that may become extremely difficult before the year is over, even the hints of war and the possibilities, if not actual probabilities, of the enactment of regulatory legislation of one kind or another—all these and perhaps many other influences may have far-reaching effects upon business. Even so it is doubtful if the combined influences will substantially lessen paper consumption in the immediate future. In this there is assurance of good business—providing capacity does not increase too rapidly.

Industry Expansion

"No one can observe the rapid expansion in the South without recalling recent experiences in Canada. New mills now planned, in addition to the increase in existing capacity through improvements, amount to a substantial tonnage. An increase of well over ten per cent is already in sight. If the consumption trend maintains its present rate of growth, we can absorb some, even substantial increase, in tonnage capacity. But whether or not all that is now projected will find immediate profitable outlet is indeed problematical.

"Moreover, it is likely that capital will continue to flow into the industry. A current as strong as that which has already brought nearly $100,000,000 of new investment into the industry is not apt to stop suddenly of its own accord. To many, the industry appears to be moving irresistibly toward a catastrophe similar to that which occurred in the newsprint industry within the last ten years.

Apparent Shortage of Wood Pulp

"A contributing factor to the expansion wave is an apparent world-wide shortage of wood pulp. Although no estimates agree, it is probable that a million tons of wood pulp will be used in the world this year for purposes *other than for paper manufacture*. This demand added to the rapidly growing requirements for paper manufacture has resulted in a complete reversal of the wood pulp situation. Since 1921 the supply seemed to be greater than demand and world prices broke down. Today the demand exceeds the supply and spot prices have jumped upward perhaps as much as fifty per cent, and this is bound to affect contract prices sooner or later. Paper prices already reflect these influences.

"Although the costs of manufacturing pulp have undoubtedly increased in every pulp producing country, they certainly have not increased as rapidly as have pulp prices. As a matter of fact, the price of pulpwood has not moved yet substantially above the depression levels in many important pulp producing countries. The current situatjon is, therefore, not a true reflection of increased costs; it is the reflection of a demand that has finally caught up with and now exceeds the supply, apparently in substantial amount. Obviously, unless manufacturing costs increase proportionately, the price structure can topple if either demand suddenly slackens or supplies increase. This is not an entirely healthy situation.

"No one will deny that high product prices and low raw material costs constitute a powerful attraction to capital. It is likely to lead to over-expansion and consequent reaction. It is this possibility that creates apprehension in the industry.

"If the theory that economic action is followed by reaction in essentially the same degree is sound, the current market situation must be our immediate concern. It is my belief that the welfare of our industry for a considerable period in the future depends upon what takes place in 1937. Wisdom and foresight as an essential in handling one's individual markets is just as essential in times of improvement as in periods of recession.

Advance of Technical Knowledge

"We know also that the advance of technical knowledge is not integrated with the swings of the economic pendulum. Spurred on by the incessant urge for lower costs, research is rapidly revolutionizing our industry and the demand for men who have acquired through academic training ability to conduct investigative research projects and to put the results of such projects into practice, is greater today than ever before.

"Recognizing this, a group of companies in 1929 joined together to establish a school for advance training of men for the industry and coincidentally an organization, adequately manned and equipped, for conducting research upon a much broader basis and at less cost than any one company could afford. In this way the Institute of Paper Chemistry began. Today the Institute has reached a position in both academic and research fields that is unequaled in American industry. The Institute, now supported by 60 companies, is a proud tribute to cooperative action. Its products, trained men and research results, can be depended upon to keep those who avail themselves of its resources, moving forward through the maze of changes and shifts, economic and technical, that experience indicates always awaits the manufacturer of paper and pulp. Moreover, the Institute is an asset to the whole industry, for its facilities are quite generally available at reasonable cost to assist in association projects.

Financing Co-operative Activities

"In closing, I wish to speak about financing our association. Back in 1934 when the industry's financial resources were severely depleted, our associations did not lack adequate financial support. Funds that undoubtedly added to the red figure of many companies were forthcoming without complaint. In addition, many executives gave unstintingly of their time to cooperative activities, which involved expenses that may have been as great in many cases as association dues. But today when the industry approaches a position of

profitable operation, there is some complaint concerning association dues.

"A member of the Board of Governors at the annual meeting in 1934, pointed out that a time would undoubtedly come when company executives could no longer give to industry matters the attention that they were giving at that time. He added that in the meantime, the industry should see to it that association personnel were trained to handle many activities that were then being carried on by company executives. He stated further that when that time came the cost of association operation would increase in so far as dues were concerned, but that the total cost of cooperative work in the industry as a whole would be substantially reduced.

"That prophecy has come true. The time has come when the industry's demands upon company executives must be reduced. The personnel of our associations must accept greater responsibilities. The extent to which this may be done depends largely upon adequate financing. If our industry is to keep pace with other great American industries, if our interests are to be protected adequately in national legislation and economy, we must finance adequately the agencies through which we work."

Ernest G. Draper Addresses Meeting

Asserting that there had been a sharp increase in exports of American paper products, Ernest G. Draper, Assistant United States Secretary of Commerce, credited this gain to reciprocal trade agreements now in force in addressing the paper manufacturers' meeting. Mr. Draper cited statistics on foreign trade in paper and wood products showing that United States paper exports have expanded from a low depression point of $18,000,000 in 1932 to $34,000,000 in 1936, and attributed this rise largely to advantages of the reciprocal agreements. He outlined the various functions of the Department of Commerce, both domestic and abroad, and stressed particularly the marketing research division, Census Bureau data, statistical reports and information, Patent Office activities, and the individual services for the paper and pulp manufacturing industry.

Mr. Draper urged industrial leaders to get behind proposed legislation outlawing child labor and excessively low wages and excessively long hours, and to support the trade agreements and other constructive legislation.

D. C. Everest Introduced as New President

In presenting the newly elected president of the Association, Mr. Sensenbrenner stated that Mr. Everest required no introduction whatever since the latter's 37 years of experience in the industry and his long and active participation in the industry's affairs had made him widely and favorably known throughout the paper industry.

Mr. Everest responded by saying that he felt deeply appreciative of the honor conferred upon him in being elected president, and appealed to all of the membership for their aid during his administration of the destinies of the A. P. P. A.

"I sincerely doubt if ever in any year before has our industry been confronted with more problems, paramount among which are likely to be governmental interference and raw material shortages, and it behooves all of us to keep our feet firmly on the ground and not lose our sense of proportion," Mr. Everest said. He added that he regarded the Association as better organized than ever before, having the most complete and wideawake staff organization ever in its history, and that with such an efficient and perfected organization set-up he felt the Association will forge ahead, giving that full measure of service which the industry expects of it.

Group Chairmen Present Reports

Chairmen of the various divisional groups affiliated with the American Paper and Pulp Association were called upon for reports for 1936 activities and results in their respective branches of the industry. S. M. Phelan, of the West Virginia Pulp and Paper Company, reported for the Sulphate Pulp and Board Association; J. M. Conway, of the Hoberg Paper and Fibre Company, for the Association of Manufacturers and Converters of Tissue; C. G. Parker, managing director, for the Book Paper Manufacturers Association; Rufus I. Worrell, of the Mead Sales Company, for the Bristol Board Manufacturers Group; Kendall Wyman, of the Champion Paper and Fibre Company, for the Cardboard Manufacturers Association; Emmet Hay Naylor, executive secretary, for the Cover Paper Manufacturers Association; Irving N. Esleeck, of the Esleeck Manufacturing Company, for the Writing Paper Manufacturers Association; Folke Becker, of the Rhinelander Paper Company, for the Glassine and Greaseproof Manufacturers Association, and C. H. Sage, of the Kimberly-Clark Corporation, for the Groundwood Paper Manufacturers Association.

Also, William H. Anders, of the Nashua River Paper Company, for the Kraft Paper Association; W. J. Dixon, of the St. Regis Paper Company, for the Paper Shipping Sack Manufacturers Association; Louis E. Vose, of the Hollingsworth & Vose Company, for the Specialty Paper and Board Association; H. O. Nichols, of the Crown Willamette Paper Company, for the Sulphite Paper Manufacturers Association; Oliver M. Porter, secretary, for the United States Pulp Producers Association, and Robert S. Kellogg, secretary, for the News Print Service Bureau.

Each of these reports cited substantial increases in production and shipments during 1936 as contrasted to 1935, in some cases new hign production leve.s being established last year, exceeding the previous 1929 highs. The reports from the various branches of the industry showed the industry, from a productive standpoint, to be in a very healthy and active state, and most of the speakers forecast further production gains during 1937.

Louis K. Comstock, president of the Merchants' Association of New York, assailed the proposal of President Roosevelt to change the present status of the United States Supreme Court through an act of Congress. He stressed the point that the question was of vast importance to business men for the reason that business men are in a minority, and that if the court is ever subjected to the dictation of the Chief Executive of the nation the rights of minorities would be seriously imperiled.

Committee Reports

Norman W. Wilson, chairman, presented the annual report for the Committee on Public Affairs, and was followed by John R. Miller, who as chairman rendered the annual report for the Import Committee of the American Paper Industry. Ernst Mahler, chairman, reported for the Technical Committee, and D. C. Everest presented the report of the Trade Customs Committee. Ralph A. Hayward as chairman rendered the annual report of the Cost Engineering Committee.

Import Committee Report

The report of the Import Committee of the American Paper Industry was presented by John R. Miller, Chairman, on the afternoon of February 25, 1937, at the meeting of the Board of Governors, American Paper and Pulp Association.

Mr. Miller stated in part that the Import Committee of the American Paper Industry devoted a large part of its time during 1936 to broad problems, such as the reciprocal trade agreements, without the slightest diminution of its efforts to check specific evasions of the tariff law; that one direct result of the Import Committee's studies of the effects of the reciprocal trade agreements has been a decided change in the Administration procedure; that another result of the Committee's activities in connection with reciprocal trade agreements was the decision of the State Department to permit producers to file complaints with a view to changes in trade agreements which are shown to be working undue hardship on any particular domestic industry; that importing interests have announced their hope of securing modifications of administrative provisions of the existing Tariff Act; that the reported plans of the importers include a modification of the regulations requiring marking of imported goods to show the country of origin, and to take from domestic manufacturers their present rights of recourse to the Custom Courts; that the success of the Import Committee in stopping the German barter program was a notable accomplishment of the year—shipments being made under this practice at a sales price of more than 30 per cent below the proper price; that imports of paper, exclusive of standard newsprint, increased nearly 20 per cent during 1936 as compared with 1935, or

nearly twice the percentage of increase in domestic production; and that of this increase in imports, totaling two and a quarter million dollars in value, the larger portion was papers on which the reciprocal trade agreements had reduced the rate of duty.

Social Features

Social features of the convention included the annual luncheon of the Salesmen's Association of the Paper Industry in the Grand Ballroom of the Waldorf-Astoria on Tuesday; the Technical Association's yearly luncheon on Wednesday in the hotel's Grand Ballroom; the Paper and Twine Club luncheon on Wednesday, the National Paper Trade Association's frolic at the French Casino Monday evening, and luncheons of various of the individual association groups.

◆ ◆

◆ National Paper Trade Association

The thirty-fourth annual convention of the National Paper Trade Association of the United States, whose membership comprises the leading paper jobbers and merchants of the country, was held at the Waldorf-Astoria Hotel, New York, on February 22-25, inclusive, simultaneously with the paper manufacturers yearly gathering. An exceptionally large number of merchants attended the convention this year, and those present represented many sections of the United States.

Officers elected for the ensuing year were: F. Bendel Tracy, Fort Hill Paper Company, Boston, Mass., president, succeeding O. F. Marquardt, of Marquardt & Co., Inc., New York City; George Cobean, J. W. Butler Paper Company, Chicago, vice president in charge of the Fine Paper Division; Finley T. Jamison, Interstate Cordage & Paper Company, Pittsburgh, Pa., vice president in charge of the Wrapping Paper Division; C. W. Vernon, Vernon Bros. & Co., New York City, treasurer; A. H. Chamberlain, New York City, executive secretary, and C. A. Spaulding and J. H. Londergan, assistant secretaries.

◆ Machinery Manufacturers Association

The National Association of Manufacturers of Paper and Pulp Machinery and Equipment held its annual meeting in New York at the Hotel Lexington on February 23 in connection with the convention of the American Paper and Pulp Association. Phillips Dennett, president of the Bird Machine Company, was re-elected president of the Association, and the other officers also were re-elected. Charles L. Bauer, of Bauer Bros., was again chosen vice president; W. B. Wilshusen, of the Cameron Machine Company, was named treasurer, and John Cornell was continued as secretary.

Various matters were brought up for discussion at the meeting.

Proper Care of Commutators Will Save Repair Bills

L. E. MILLER
Electrical Engineer, The Reliance Electric & Engineering Company, Cleveland, Ohio

IN entering into a discussion concerning the proper care of direct-current motor and generator commutators, it must be admitted that this is a highly debatable subject. Nearly every maintenance engineer has his own pet methods which he is prepared to defend against all others. The following suggestions are put forward merely as the result of experience based on many thousands of machines.

In practically all cases, the machine should be put into service in the condition it is received from the manufacturer. It has just been thoroughly tested, the brushes well bedded-in to fit the commutator contour, and the commutator itself finished to as high a degree of perfection as is possible without actual long-time running. It should, however, be very carefully watched during the first six months of service; because it is during this time that it is being finally polished by the action of the brushes, and is—or ought to be—assuming the glossy and generally chocolate-brown appearance which promotes long-wearing characteristics both for the commutator and for the brushes. Unless burning or roughness appears, therefore, the commutator should not be touched with any grinder or sandpaper.

If any roughness or burning does appear, however, the trouble should be immediately investigated and eliminated. Insufficient or excessive brush pressure, high mica insulation projecting above the commutator bars, overloading, whipping of belt, uneven gears, vibration caused by machine on which motor is mounted, or unequally-bedding brush surface, should be looked for and corrected.

If roughness appears, as it may do even on the best manufactured commutator because of the "seasoning" of the mica while running, or from flashing caused by excessive starting load or by high "dynamic braking" or heavy overload current, it should be removed by fine sandpaper—never by emery cloth, because emery dust will become imbedded in the bars and cause them to become abrasive like a lapping block. If sandpaper will not remove the roughness, a commutator stone may be used. If this also fails, the only remedy is to turn the commutator in a lathe. Care should always be taken that no oil gets on the commutator surface. Such oil will be absorbed by the insulation and cannot be removed except by rebuilding the commutator and replacing the oil-soaked mica.

If, owing to brush-chattering or other cause, commutator-lubrication appears necessary, a small amount of paraffine wax may be used during the time the commutator is seasoning. When a commutator is first manufactured, the surface is covered with innumerable microscopic ridges. These ridges cannot be removed except by the wear resulting from actual running over a long period. While it has not been definitely proved what is the action of the paraffine on a commutator of this sort, it would seem that the material fills in the minute valleys between the ridges and thus tends to prevent excessive wear of the brush during the seasoning-in time. If paraffine is used, it should be applied very *sparingly*, by putting it on a piece of canvas in so small a quantity that it barely causes stiffening of the fabric. After applying this canvas to the commutator surface, the latter should be immediately wiped off thoroughly with a clean piece of canvas. Most modern commutators are, of course, "undercut," that is, the mica insulation between the copper bars is cut down slightly below their level in order to avoid the risk of the mica extruding high enough during seasoning to prevent the brushes from maintaining continuous good contact with the bars themselves and so causing sparking and wear. In regard to the undercutting, the V-type of slot seems most preferred. The cutter producing this slot is so built that it not only removes the upper side of the mica itself but also a sufficient amount of the adjacent copper edges to form a small bevel at either slot-edge. To give the best results, a slot of this type may be cut much shallower than the usual C-type slot. There is no objection to the V-type slot except where the motor is operating in dirty conditions; in which case it will often collect dirt and form a short-circuit between bars. On the other hand, the V-slot being wider and shallower at the opening, is more likely to throw out the dirt than the U-type.

On some motors, however, it is not desirable to use a V-slot. This applies particularly to very small motors. In these cases the commutator is small in diameter, so that the wider slotting which is necessary for the V-type produces what is practically a number of rather flat places on the commutator. These are naturally apt to cause jumping and sparking of the brushes. A U-slot is, therefore, preferable.

In spite of the fact that many motors have been operated with insulation which is not slotted, and which is therefore flush with the commutator-surface, it would appear inadvisable on general purpose motors. After a motor has been manufactured, the seasoning and extrusion of the mica continues for quite a time. If, therefore, flush micas are used, it is necessary to use abrasive brushes from the start of operation.

TAPPI Holds Twenty-Second Annual Meeting

THE twenty-second annual meeting of the Technical Association of the Pulp and Paper Industry, catalyzed, perhaps, by the new construction activities of the past year within the industry and a record for paper production in 1936 that exceeded production figures for any previous year, completed a most successful four-day session on February 25, 1937. The meeting, held at the Waldorf-Astoria in New York, opened in general session on the morning of February 22, after which, with the exception of another general session on the third day of the convention and the annual luncheon on the same day, all meetings were conducted in the form of group meetings.

The program of the general session, over which presided G. N. Collins, President of TAPPI, included the Secretary's report, the President's report, appointment of nominating committee, special committee reports, report of fiber symposium and the presentation of three papers.

Annual Report of Secretary

The Secretary's report was presented by R. G. Macdonald.

Mr. Macdonald stated that 171 members were elected during 1936; that 55 resigned or were dropped from membership; and that the total membership on December 31, 1936 was 1354. He added that the corporate membership, on December 31, 1936, was 82 and the contributing membership was 80. Of the total, 12 corporate and 17 contributing members were elected during the past year.

The Association, continued Mr. Macdonald, sustained a loss of six members through death. The members who passed on during the year were: J. H. Wallace, J. G. Ramsey, A. H. Hooker, Sr., J. N. Devereaux, A. J. Kennedy and C. W. Perry.

Considerable emphasis was placed by Mr. Macdonald on the special reports on manufacturing problems. He listed 21 special reports that were issued in 1936. These reports ran the gamut from warping of news board to fuzz in newsprint, sulphite cooking procedure, supercalendering data, drinking of carbonate filled papers, multi-stage bleaching, et al.

The co-operative activities of TAPPI and the activities of the local sections were touched upon briefly by Mr. Macdonald before proceeding with a listing of changes in chairmanship personnel of the various committees. In the raw materials division, W. A. Chapman of Skinner & Sherman, Inc. was appointed vice-chairman, and a special committee on lime specifications with John Traquair as chairman appointed. S. D. Wells of Combined Locks, Wis. succeeded G. D. Bearce of the Maine Seaboard Paper Company as chairman of the preparation of fibrous materials committee. R. I. Wynne-Roberts of the Norton Company succeeded M. P. Chaplin of Portland, Maine as chairman of the mechanical pulping committee. Vance P. Edwardes of the International Paper Company succeeded W. H. Swanson of the Kimberly-Clark Corporation as chairman of the acid pulping committee. George D. Bearce succeeded

GRELLET N. COLLINS
Re-elected President

Frank C. Ladd of the Keith Paper Company as chairman of the paper manufacturing committee and A. O. Spierling of the Hammermill Paper Company was appointed vice-chairman. H. W. Morgan of the Institute of Paper Chemistry succeeded R. C. Griffin of Arthur D. Little, Inc. as general chairman of the Testing Division and Jas. d'A Clark of the Scott Paper Company, was appointed vice-chairman. W. O. Hisey, of The New York State College of Forestry succeeded H. W. Morgan as chairman of the pulp testing committee.

No changes were reported in the management division, the engineering division, and in the research and development division.

The laminating committee in the converting and consuming division was discontinued. A committee on paper bags within the same division was organized and a committee on envelopes is in the process of organizing. R. M. Bates of the Thomas M. Royal Company heads the new committee on paper bags.

Mr. Macdonald further stated that a committee consisting of the division chairmen and John L. Parsons was authorized to expend $3,000.00 for financing research work for the benefit of the Association committees; and that from June 10 to 17 about 23 members of the Association, upon invitation from the Institute of Paper Chemistry, attended a symposium at the Institute devoted to a study of fiber identification.

In concluding his remarks, Mr. Macdonald praised the work of the chairmen in their respective services to the Association and suggested that TAPPI will be fortunate to continue to have such wholehearted and competent support.

President's Report

The report of Mr. Collins emphasized the fact that the industry's need for technological service is greater than ever. In his remarks he reviewed the world pulp situation, touched upon the expansion of pulp production in the South, commented briefly upon research, and told of TAPPI service to the industry.

The approximate world production of wood pulp in 1934, said Mr. Collins, was 19,875,000 short tons. He cited the proposed new tonnage, estimated it as 3,315,500 tons, and assumed that a total of 24,190,500 short tons will be in production by 1939.

If the United States, continued Mr. Collins, increases its production by 1,500,000 tons, it will maintain its position as the largest producer of pulp and paper in the world. The proposed expansion of pulp and the interest shown in the South, he said, is going to have a far-reaching effect.

All of this in the opinion of Mr. Collins is going to present opportunities to technical men—engineers to design and construct new plants and equipment; technical operators to select equipment, machinery and process to incorporate in the new plants; technical men to operate and manage the plants; and technical men for control and research work.

The industry, according to Mr. Collins, has had to become research conscious in a large way, but has not as yet scratched the surface in the development of by-products. Research was cited as the means to accomplish this end.

Reference was made to the excellent work of the U. S. Department of Agriculture in surveying the forest resources of the country; to that of the U. S. Forest Products Laboratory at Madison, Wis.; and to that of the Bureau of Standards at Washington, D. C.

Mr. Collins then commented on plans that are being considered to expand the service of TAPPI with an enlarged headquarters staff; and mentioned that a management letter or bulletin has been an ambition of the Association for a number of years.

The steady growth of TAPPI, concluded Mr. Collins, shows that the Association is improving with age, and that the present outlook is particularly pleasing.

Sensenbrenner Welcomes TAPPI Delegates

Members of TAPPI assembled in the general session were welcomed by F. J. Sensenbrenner, President of the American Paper and Pulp Association. He stated in part that in behalf of the American Paper and Pulp Association he was glad to welcome the members of the Technical Association; that he was connected with the industry for many years before there were many technical men; that a host of technical problems grew up over night when the consumption of paper demanded more than our limited pulpwood supplies of those days would support, and when we were forced to turn to other wood supplies; that training through membership in TAPPI is exceedingly valuable to the industry; and that in his opinion there is opportunity for more thorough co-ordination of activities among our various associations. He then cited the federated organization structure of the various associations; called attention to the experience that has been gained in conducting their co-operative activities; suggested that the time has come when a greater degree of co-ordination must be developed; and expressed for this co-ordination growing from the affiliated associations rather than being superimposed by the central association.

Report of the Textbook Committee

R. S. Kellogg, Secretary of the News Print Service Bureau, reported on the work of the textbook committee. The report exhibited the very satisfactory financial condition of the committee, told of textbook sales, and indicated that the editor and his staff of associates and contributors were engaged throughout the year upon revisions of Volumes III, IV, and V. Total textbook sales to date of report amounted to 25,421 copies with Volume III being the best seller and with Volumes IV and V following closely in the order given. Revised Volume III came out on February 9, 1937; and it is expected that revised Volumes IV and V will be published by August and December respectively.

Nominating Committee Appointed

Max Krimmel of the Hammermill Paper Company, Allen Abrams of Marathon Paper Mills Company, and Clark Heritage of Oxford Paper Company were appointed as a nominating committee to present a slate of officers before the general session on February 24.

Papers of General Session of First Day

Three papers were scheduled for presentation before the general session on the morning of February 22. These papers were: *Skin Substances in Pulp Fibers*, by F. E. Brauns and H. F. Lewis, both of the Institute of Paper Chemistry; *Paper Machine Conversion Losses*, by J. P. Hagenauer, consulting engineer, American Paper and Pulp Association; and *Problem of Paper Mill Modernization*, by Frederic C. Clark of Skinner & Sherman, Inc.

Fiber Changes During Cooking and Bleaching

Dr: Lewis presented the joint paper by Mr. Brauns and himself. This paper, in the form of a progress report, considered the changes in fibers during cooking and bleaching. Work during the past year, stated Dr. Lewis, has been concentrated on the isolation of the fibrous membrane from western hemlock bleached sulphite. He also referred to more recent work in which effort was being made to develop an ash free specimen and to determine sugar content.

Paper Machine Conversion Losses

Dr. Hagenauer in his paper, based on data furnished the Cost-Engineering Service of the American Paper and Pulp Association by 30 paper mills over a period of 15 months, analyzed the paper machine conversion losses and their value to the industry. The major loss as to quantity as well as value, confining himself to book, writing and sulphite wrappings, said Dr. Hagenauer, is fiber. This loss, he continued, represents, on an oven-dry basis, 5.85 per cent of all fiber furnished for book, 5.74 for writing, and 7.80 for sulphite wrapping. Percentage losses for other materials were also given. The total loss of all furnish materials for the three groups combined was given as $8,134,051 per year based on figures for the period 1925-1935 inclusive.

The total tons of fiber lost in the same eleven-year period, continued Dr. Hagenauer, was 1,360,486 tons. This tonnage, assuming two cords of wood per ton of fiber, represents the equivalent loss of 2,720,972 cords of wood. Assuming the production of five cords of wood per acre, it also represents the production of 542,194 acres, and the loss per year of 49,290 acres.

Putting it more concretely, Dr. Hagenauer stated that the yearly loss of furnish materials represents the approximate value of two self-contained one-machine mills as indicated by developments in the South.

Dr. Hagenauer further commented upon the retention of various furnish materials, gallons of water per ton of paper, and concluded with a challenge to technical men.

He stated that the study showed that clay varies in per cent from a retention of 92.58 maximum for book to 43 as a minimum, 70 maximum to 31 minimum for writing, and from 50 maximum to 40 minimum for sulphite wrapping; that size varies from a retention of 91.96 maximum to 35 minimum for book, from 92 maximum to 50 minimum for writing, and from 75 maximum to 40 minimum for sulphite wrapping. Similar comparisons were made for starch, and alum.

Water consumption figures furnished by only five mills out of the thirty mills included in the study and reported in gallons per ton of paper, revealed a maximum of 47,000 and a minimum of 10,230 for book; a maximum of 28,000 and a minimum of 25,900 for writing; and a maximum of 25,558 and a minimum of 22,306 for sulphite wrapping.

Advancement of technical men in the industry to higher and more responsible positions, concluded Dr. Hagenauer, depends entirely on ability to co-ordinate research with practical application, an increased efficiency in operations, and on the resulting savings made in the cost of production.

Paper Mill Modernization Problems

Mr. Clark in his paper stated that the real problems of any individual manufacturing plant, and often those most difficult of solution, are outside the plant; that the most serious criticism of many manufacturing companies and their management is lack of dollar consciousness; and that the manufacturer is confronted with the task of re-orienting himself to changed economic conditions. He then suggested the need for a plan by each mill confronted with large expenditures for repairs and improvements and proceeded to set up an outline for a plant survey and to explain this outline in detail. The headings covered by the outline were: general statement of problem; mill layout and buildings; equipment; raw materials and supplies; routing of materials through the process; products made; manufacturing operations; cost control; proposed improvements and advantages; personnel; sales; and conclusions.

In explaining the various headings of the outline, Mr. Clark stated in part that the purpose of the study is to present a true and concise picture of present conditions and the necessary steps that must be taken to enable the mill to operate at a profit; that competition today demands that every possible economy be secured in the operation of an industrial plant; that the study of equipment is extremely vital to any plant and a survey must consider each piece of equipment, its capacity, and whether it is capable of doing the work required; that a careful study should be made of raw materials and supplies in use to determine whether they are best adapted for the purposes intended; that it is important to prepare at least a simple line sketch showing general layout of plant and routing of materials throughout the process; that a study should be made of the general quality of products made by a particular mill as compared with similar products made by competitors; that management in many mills does not know the true capacity of its equipment; that the most essential part of the management of any paper mill organization is its cost finding department; that the successful operation of any paper mill requires the closest possible supervision of many minor details; that the majority of

workers in any plant are much more interested in doing a good job than they are in doing a poor job; and that lack of co-operation between sales and manufacturing too often exists in paper mills.

Afternoon Group Meetings of First Day

Three group meetings were scheduled for the afternoon of the first day. One was the preparation of non-fibrous materials meeting; another was the production and personnel management meeting; and the third was the mechanical pulping and materials of construction meeting.

H. C. Schwalbe of Dill and Collins presided over the meeting on the preparation of non-fibrous materials; H. G. Noyes of Oxford Paper Company and W. M. Shoemaker of National Vulcanized Fiber Company, over the production and personnel management meeting; and R. I. Wynne-Roberts of the Norton Company over the mechanical pulping and materials of construction meeting.

Preparation of Non-Fibrous Materials Meeting

The first of the six papers scheduled for presentation before the group meeting on preparation of non-fibrous materials, was entitled, *The Optical Properties of Paper*, and was the subject of Dr. F. A. Steele, formerly of the New Jersey Zinc Company and now with C. K. Williams Company. Dr. Steele showed how previous adaptations of the Kubelka-Munk equations can be used to determine the individual contribution of the components of paper to its opacity and presented some data on the relative opacifying powers of various fibers and fillers.

Clay Structure

The second paper was entitled, *The Structure of Clays*. It was the subject of Dr. W. W. Meyer of the U. S. Bureau of Standards and was read by Dr. Ernst Hauser of the Massachusetts Institute of Technology.

Colloid Chemical Aspects of Clay

Following Dr. Hauser's reading of Dr. Meyer's paper, he presented a paper by himself on *Colloid Chemical Aspects of Clay as a Loading Material.*

In this paper, Dr. Hauser, well known as a colloid chemist and teacher, limited his discourse to such colloidal aspects of clays as he believed worthwhile for the paper chemist to study in more detail. Natural clays, when properly treated, he said, yield up to 90 per cent of truly colloidal clay. He mentioned air floating, sedimenting or water floating as the most common methods for the separation of impurities from natural clays prior to any grinding operation and that such separation would make it possible to obtain a product having particles not over 2 μ in size. In the paper industry, he continued, the term, "clay," mainly refers to aluminium silicate known as kaolin and china clay. Dr. Hauser also stated that the addition of deflocculating or dispersing agents to the clay suspension when being made, or to the beater, if the clay is added in dry form, will guarantee the maintenance of a uniform fine distribution; that the shape of individual clay particles is generally considered to be platelike in character; that the most important property of clays to his knowledge which has so far received insufficient attention in the paper industry is their ability to exchange a certain amount of cations for the cations of electrolytes present in the environment; that this exchange capacity known as "base exchange" varies with different clays and runs anywhere from 15-100 milliequivalents of exchangeable cations per 100 grams of natural clay; and that base exchange phenomenon can result in clays exhibiting very different properties, depending on their treatment and on the environment.

Influence of the Solid on Dilute Suspension Flow Properties

R. N. Traxler of The Barber Company presented the next paper on the program of the preparation of non-fibrous materials meeting. His subject was *Influence of the Solid on the Flow Properties of Dilute Suspensions*, and, in presenting it, he called attention to three types of flow; namely, viscous, quasi-viscous, and plastic; and pointed out that particle size, size distribution, and shape are primary properties of the particles of a mineral filler, and that dependent on these are such secondary properties of the compacted powder as per cent voids and average void size. Mr. Traxler also mentioned methods for determining both primary and secondary properties; and evaluated the influence of the dispersed solid on the viscosities of liquid-solid systems. The viscosity of a liquid-solid system, he said, appears to be inversely proportional to the average void size of the pulverulent solid as present in the mixture and, that as the concentration of the solid is increased, the viscosity will increase.

This paper by Mr. Traxler, as did the paper by Dr. Hauser, elicited considerable discussion. It was brought out in the discussion of the two papers that ignition breaks up the atomic structure of clay; that there is much to a clay slurry besides viscosities; and that flow properties are very important. Brush marks also were compared to studies on paints.

Filler Clay Developments

The fifth paper before this group meeting was presented by C. G. Albert of Edgar Brothers Company. His subject was *Recent Developments in Filler Clays*. Mr. Albert explained that the most likely improvements in paper clays expected to result from increased research work are greater uniformity, more clays with selected particle size ranges, and higher brightness clays. He likewise mentioned that research work has already made possible the production of clay with 95 brightness.

The retention of fillers in the sheet, commented Mr. Albert, has been shown by a number of writers to take place by a mechanism involving not only filtration, but also adsorption of the filler, diffusion into the fiber, and occlusion by resin and aluminum hydrate flocs. The retention depends, he said, upon a large number of factors, among which are particle size and shape, pH, nature of pulp, temperature, and the amount of size and alum added.

Micrographic study of the surfaces of blackened sheets, continued Mr. Albert, indicates a possibility of a shifting of a coating with respect to raw stock—a flow under pressure which occurs during calendering—thus causing sufficient irregularities in the sheet to give a mottled, somewhat blackened appearance. The shadows of these irregularities in the relief structure were not suggested by Mr. Albert to be the only type of blackening but, he said, that they are quite likely a contributing factor.

The paper by Mr. Albert raised a number of questions. One question related to the ink receptivity method of measurement; and another to the use of incident light in the studying of blackening. It was suggested that blackening looked like crushing; but Mr. Albert stated that there was more to it than that. The control of the opacifying power of filler clay also was suggested.

Sveen Method of Increasing Wire Retention

P. M. Loddengaard of the Bulkley-Dunton Company presented the sixth, and last, paper of the afternoon session. His paper was entitled, *The Sveen Method of Increasing Wire Retention of Filler and Fiber*, and, in his remarks he referred to present recovery systems as corrective methods and said that improved retention could be obtained upon the wire without changing the character of the sheet through the use of a preventive method. This method, the Sveen method, consists in the proper application of a weak, bone glue solution that has been specially prepared and allowed to mature. This glue solution cannot be added in the beaters. Neither can it be added ahead of the sandtrap. It must be added at the discharge of the screen or at the flow box in an amount equal to 1 to 3 pounds per ton of paper. Such an application was cited as being different from the ordinary use of glue.

Mr. Loddengaard further remarked that with this method mill results were sometimes better than laboratory results; that the paper web forms quicker and denser on the wire; that the white from the wire contains less solids and that a pH of tray water of 4.7-4.6 gives the biggest increase in retention.

In the discussion which followed the presentation of this paper, Mr. Loddengaard stated that he did not believe that the use of the Sveen method would have any effect on opacity; that a check has not been made on its effect on bright-

ness; that the glue used is Peter Cooper's 175; that the method will be applied shortly in connection with the Fair process; that formation is disturbed very little if at all; that most of the effect is on the filler; that he is not certain if the method would improve two-sidedness of paper; that the method has a definite effect in overcoming two-sidedness of deeply colored paper; that it is just as effective on unsized as sized paper; and that it has no tendency to size the paper but that it does tend to hold the rosin.

Production and Personnel Management Meeting

The production and personnel management group meeting was opened with a paper by Sanford E. Thompson, President, The Thompson & Lichtner Co., Inc., on *A Brief Survey of Management Methods in Paper Mills.* In this paper, based on a survey of management methods in the paper and pulp industry conducted with the co-operation of the Technical Association, Mr. Thompson brought out the need for larger utilization of the results of research and standardization in the practical operation of the plant, the development of a higher degree of personal initiative of the foremen and other employees in maintenance of standards of production and quality of waste, and more scientific management of sales.

Successful management, said Mr. Thompson, involves production control and planning; control equipment; technical control and standardization; satisfactory labor relations; and modern sales methods. In continuing his remarks, Mr. Thompson stated that many mills even today operate by rule of thumb but that a remarkable improvement in management is evidenced in the more up-to-date plants; that the use of control equipment is increasing rapidly; that one of the most encouraging features brought out by the study is the widespread use of technical research and standardization; that the weak point, even in many of the best mills, appears to lie in the management end; that successful operation in all of such process work requires the development by the management of the initiative of the worker to accomplish his job to the best of his ability; that incentives in a paper or pulp mill in which quality is not a first requirement are worse than useless; that incentives properly applied, based primarily on quality of product or maintenance of technical standards, result in better paper, increased productivity, less waste, lower cost, and improved labor relations; and that selling methods vary widely with different companies, both as regards outlets and methods of management.

Organized Personnel and Industrial Relations

The second part of the program was devoted to considerations indicating the value of organized personnel and industrial relations departments for pulp and paper mills. Mr. Shoemaker, in leading the discussion for this portion of the program, called attention to the fact that organized industrial relations in American industry began about 25 years ago; and referred to the drive about 1912 toward the enactment of workmen's compensation laws and to the increasing attention given to industrial safety. He stated that the post-war depression period marked a rather severe curtailment of welfare activities and personnel measures in a rather drastic cost-cutting program.

Reference was made to the organization of the Personnel Research Federation and to the Worker's Education Bureau of America, both in 1921, to the Princeton University Industrial Relations Section in 1922; and to the American Management Association in 1923.

Mr. Shoemaker, in continuing his remarks, stated that there has been a decided trend toward social legislation since 1929; that much of the pioneering work in the field of industrial relations has been done in the pulp and paper industry; that the Pulp and Paper Section in the National Safety Council is both one of the oldest sections and one of the most active in the Council; that the necessity for training has been recognized by the leaders in the industry for nearly 20 years; that the Technical Association has been interested in scientific personnel management for many years, but until three years ago expressed itself largely through the committee on training; and that since 1934 an attempt had been made to develop and to bring to the attention of TAPPI members the importance of scientific management in the field of industrial relations.

In concluding his remarks, Mr. Shoemaker turned the meeting over to Mr. Noyes who called upon G. J. Adams of the International Paper Company to present a paper upon *Safety—Its Part in Paper Mill Operations.*

The Mill Manager's Part in the Safety Program

In the opinion of Mr. Adams, personal supervision by the mill manager in a personnel problem such as safety cannot be expected; but the mill manager should lay down the policy to be followed and to give his support in delegating the responsibility for carrying out an accident prevention program. After pleading the cause of the person chosen to head up the safety program, Mr. Adams proceeded to discuss how can management function best in a plant accident prevention program and to what extent management should actually participate in safety in regular mill operation.

He said, that if he were to call upon personal experience to answer the question, that he would say that no safety program can be carried out successfully over a period of time without some active participation by the mill manager, regardless of how efficient and complete a safety organization has been set up. An attitude of safety consciousness, he continued, is built down—the boss of the mill must initiate it. He then explained the system in use in the company with which he is connected to illustrate just how the manager can lend support.

A successful method employed by one mill manager to overcome an epidemic of accidents was cited. It consisted simply of calling the foreman of the injured man to the office immediately after the accident and questioning him briefly but pertinently regarding it. He also referred to the general manager of an eastern paper mill with an excellent safety record. This manager, he said, has been known to get out of bed in the middle of the night to go to the plant to investigate an accident immediately after it happened—he being informed of the accident as a result of his orders.

Active participation or the setting of example by the manager, concluded Mr. Adams, will govern the success of the safety program above everything else.

The rest of the meeting was given over to some brief but very pertinent remarks by L. J. Parant, General Manager, St. Croix Paper Co. and to a discussion, led by Mr. Noyes, on a wide range of personnel subjects.

Mechanical Pulping and Materials of Construction Session

The program of the meeting of the mechanical pulping and materials of construction group included a paper by R. I. Wynne-Roberts of the Norton Company on *Grinding Characteristics of Various Woods;* one by W. J. Walker, Plant Manager, Pulp and Paper Laboratory, Savannah, Ga., on *Grinding Southern Pine Under Semi-Commercial Conditions;* a third entitled *An Investigation of Process Variables Using a Miniature Pulp Grinder,* by J. Edwards, G. D. O. Jones, G. J. Potter and H. Wyatt Johnston, presented by Mr. Johnston, as a contribution from the Pulp and Paper Division, Forest Products Laboratories, Dominion Forest Service, Lands, Park and Forests Branch, Department of Mines and Resources, Canada; and a paper by J. D. Miller, Southern Kraft Corporation, on *Sulphite Mill Construction Methods.*

Grinding Characteristics of Woods

The paper of Mr. Roberts was based on grinding experiments with loblolly pine, shortleaf pine, cottonwood, poplar, jack pine, hemlock (eastern), spruce, and balsam. The grinder used for the investigation was a three pocket unit housing a 54x27 inch stone with fresh water showers being used on the stone.

Some very interesting figures were presented by Mr. Roberts on the relation of yield to density, grinding characteristics of woods at Mullen strength of 8 pounds, and color characteristics of pulps. These figures are reproduced herewith:

TABLE I—RELATION OF YIELD TO DENSITY

Kind of Wood	Density	Yield per Cunit
Loblolly pine	.49	3000
Shortleaf pine	.48	2850
Cottonwood	.44	2700
Poplar	.43	2575
Jack pine	.41	2500
Hemlock (Eastern)	.40	2450
Spruce	.38	2375
Balsam	.34	2050

Density: Oven-dry weight on green volume.
Yield: Pounds a.d. screened stock per cunit.

TABLE II—GRINDING CHARACTERISTICS OF WOODS AT MULLEN STRENGTH OF 8 POUNDS

Wood	Freeness cc.	Tons per 10 sq. ft. per day	Horsepower per ton per day
Spruce	115	12.0	70
Balsam	68	9.6	80
Hemlock	40	7.4	108
Jack pine	58	8.0	105
Shortleaf pine	42	6.4	125
Poplar	37	6.0	140
Loblolly pine	25	4.8	150
Cottonwood	22	3.2	215

TABLE III—COLOR CHARACTERISTICS OF PULPS

Kind of Wood	B. and L. Per cent White[1]	Brightness[2] Per Cent
Cottonwood	85.5	63.0
Balsam	85.0	58.6
Spruce	81.5	56.4
Loblolly pine	81.0	52.3
Shortleaf pine	81.0	53.1
Poplar	81.0	58.3
Hemlock (Eastern)	77.5	52.8
Jack pine	75.0	42.4

[1] B. and L.: Bausch and Lomb opacimeter.
[2] Brightness: Institute reflectance meter.

Southern Pine Grinding Experiments

Mr. Walker in his paper reviewed briefly the previous work that has been done in the grinding of southern pine, both at the Pulp and Paper Laboratory of the Industrial Committee of Savannah and at the Forest Products Laboratory at Madison, commenting that the work at Madison has been fundamental research while that at Savannah has been semi-commercial in character. He also furnished detailed information on the equipment employed in the Savannah laboratory for the grinding experiments, information on grinder runs, and information on methods employed to make physical tests.

The wood used for this investigative work, stated Mr. Walker, was classified for grinding purposes into two groups depending upon the rate of growth—the rate of growth being designated by the number of rings per inch. He further stated that the laboratory had formed a workable division of 1.5 to 2.5 as fast, and for slow growing wood 3.7 and more—the density of these two types of wood varying between limits of .41 and .48 for fast growing and .50 and .60 for slow growing.

Mr. Walker also described the method employed in operating the grinder, mentioning that it was found necessary to heat the stone for at least two hours to bring it to proper temperature for best results in grinding; listed the following kinds of stones as being used in the work—Lombard natural sandstone; Carborundum-Aloxite, 406-J-31, 401-K-30, 406-I-32D; Cawood natural; and Norton 80 grit N; and intimated that extreme care had to be taken in burring.

A marked difference in the pulping characteristics of loblolly and long-leaf was pointed out, loblolly in all cases giving the better results, and the several stones compared empirically as to relative value—Carborundum stones Nos. 1 and 2 giving best all around results; and Carborundum No. 3 and Norton stones giving highest strength for long-leaf. Stones are now being built, continued Mr. Walker, for our use, the construction of which is based on the result of experience with the peculiar characteristics of southern pine.

In concluding his paper, Mr. Walker expressed the appreciation of the laboratory to the Carborundum Company, the Norton Company and the Cawood Company for supplying the laboratory with pulpstones, and outlined future work at the laboratory along the following lines—development of stones, investigation of various combinations of groundwood of varying properties, investigation of current trend toward coarse grinding and refining, and investigation of pretreatment of wood with the idea of possible decrease or elimination of chemical pulp in newsprint.

W. R. MAULL
Vice President of TAPPI

Process Variables Using Miniature Grinder

The results of the investigation of process variables using a miniature pulp grinder, a 2 x 12 inch one-pocket grinder with a swinging pocket loaded by dead weight and reading direct friction drag, revealed in the paper discussed by Mr. Johnston, show that speed, temperature and consistency produced little effect upon unit energy consumption and pulp properties; that pressure decreased burst ratio and unit energy consumption and increased fiber strength; that production was proportionate to speed and increased more rapidly with respect to pressure; and that thermal balances for the grinding process showed that practically all the energy expended in grinding is converted into sensible heat.

The paper by Mr. Miller, presented in the form of a report of the Materials of Construction Committee of TAPPI, summarized the replies to a questionnaire sent to the sulphite pulp mills of the United States and Canada. The survey revealed that one mill in six had gone to 100 per cent alloy steel; that one mill in four reverted to non-ferrous alloys; that lead predominates for the rotor of the burner gas fan (42.6 per cent) and for the fan case (69.3 per cent); that only 17.4 per cent continue to use bronze for cold acid valves and only 9.1 per cent for hot acid valves; that lead was only 38.4 per cent in use for cold acid fittings; that TAPPI specification alloy (20 Cr. [min.]—9 Ni. [min.] with option of 2.4 per cent Mo.) was used in 50 per cent of the cases for hot acid line fittings and that 86 per cent used some alloy for hot acid pumps; that higher alloy content steels predominated for digester hot-relief valves and fittings; that relief cooler shells were 57.2 per cent lead; that alloy steel for relief cooler tubing totaled 66.4 per cent; that alloy steel has almost completely replaced non-ferrous metal for thermometer well service; that an alloy of 18 Cr.—8 Ni.—plus or minus 3.5 per Mo. seemed to be decidedly in favor for relief strainers (50.0 per cent); that shells for external heating of cooking acid were 100 per cent TAPPI specification while 66.7 per cent of the pumps met the same specification and 60 per cent of the tubes were 18 Cr.—8 Ni.—plus or minus 3.5 per cent Mo.; and that 56.3 per cent of blow tank bottoms were of wood, 15.6 of tile and 28.1 of alloy steel. The survey also revealed data for other blow pit accessories.

Metallizing Process

Two other papers were scheduled for presentation before this meeting. One of them, a paper entitled *Maintenance with the Metallizing Process*, was the subject of R. A. Axline, President, Metallizing Engineering Corporation. In this paper, Mr. Axline described briefly the metallizing process and equipment used in connection with it, stating that the metallizer will spray any metal which can be obtained in wire form, such as lead, tin, zinc, aluminum, bronzes, brasses, copper, carbon steels, stainless steels, nickel and nickel alloys. He also listed specific applications for the process within the industry as revealed by mills using it. These applications for metallizing ranged from the repair of shafts, bearing surfaces, rolls, pumps, etc., to the application of corrosion resistant coatings to beaters and other mill equipment.

Fractionation of Mechanical Pulps

The second paper, scheduled for presentation by title, was a joint paper by Paul D. Bray, Robert A. Thompson and Jiun Shyr, professor, student and graduate student respectively at the University of Maine, on *The Fractionation of Mechanical Pulps and Its Relation to Refining*. This paper revealed that for a definite type of pulp the Appleton selective screen will fractionate reasonably accurately; that this screen is valuable for control testing in pulp manufacture; that fine screen rejections should be re-

fined and used (thus saving good pulpwood); and that the Appleton selective screen also is of value as a control testing device for refining.

Sessions of the Second Day

Four group meetings were held on the second day of the convention, two in the morning and two during the afternoon.

The two meetings of the morning were Acid Pulping and Paper Coating. Vance P. Edwardes, International Paper Co., presided at the Acid Pulping Meeting; while J. J. O'Connor, Mead Corporation, was in charge of the Paper Coating Meeting.

The afternoon sessions included a Graphic Arts and Paper Coating Meeting and a Stuff Preparation Meeting. A. W. Nickerson, Consultant, C. F. Clarkson and J. J. O'Connor, Mead Corporation, were in joint charge of the Graphic Arts and Paper Coating Meeting; while G. Lamont Bidwell, Riegel Paper Co., and F. C. Clark, Skinner & Sherman, Inc., presided at the Stuff Preparation Meeting.

Papers of the Acid Pulping Meeting

The first paper scheduled for presentation before the Acid Pulping Meeting was a joint paper by G. H. Chidester and P. S. Billington, both of the staff of the U. S. Forest Products Laboratory, on *Effect of Varying the Concentration of Combined Sulphur Dioxide in Soda Base Sulphite Pulping.* Presented by Mr. Billington, the paper revealed that yields and strengths of pulps that have been digested to approximately the same degree with liquors of progressively greater combined sulphur dioxide concentrations passed through a maximum at 2 to 3 per cent combined sulphur dioxide when the initial total sulphur dioxide was constant at 6 per cent—a minimum occurring at 4 to 5 per cent; that mixtures of bisulphite and monosulphite produced pulps of very inferior strength, low alpha-cellulose content, and low viscosity; that monosulphite liquors produced pulps having the highest strength, especially tearing strength, but of low yield and low viscosity; and that slash pine heartwood can be pulped with a liquor of high combined sulphur dioxide concentrations.

The second paper scheduled for the meeting was entitled *An Analysis of the Sulphite Acid Making Process.* It was the subject of W. H. Swanson, Kimberly-Clark Corporation. It was followed by a joint paper of G. H. McGregor, W. N. Kelly and H. R. Heuer, Technical Director, Manager, Unbleached Pulp Superintendent respectively of Longview mill, Pulp Division, Weyerhaueser Timber Company, on *Unbleached Sulphite Pulp Manufacture from Western Hemlock.*

Unbleached Sulphite from Western Hemlock

This latter paper, presented by Mr. McGregor, outlined a few of the variables attendant to the operation, testing and instrumentation in a 200-ton mill manufacturing unbleached sulphite from western hemlock. The equipment of the mill includes six digesters and two accumulators. To the digesters, each of 6,400 cu. ft. volume, is added for each cook 33,000 gallons of hot cooking acid and approximately 32 a. d. tons of chips of an average moisture content of 46 per cent. The volume of each accumulator is 7,440 cubic feet and each holds 55,000 gallons. Strong cooking acid in the accumulators is maintained at 80 deg. C. and 50 pounds gauge pressure. Digesters are steamed through bottom fitting.

Reference was made to the low alcohol benzene and ether soluble values for western hemlock pulpwood in contrast with values for other common pulpwood species, and to the low ether extract values for western hemlock pulps in contrast with values for spruce pulps.

It likewise was emphasized that uniformity of chip size and low dirt content tend to aid in the production of high quality unbleached pulp; that the temperature of the gas at the outlet of the combustion chamber is maintained at 1,100 deg. C.; that uniformity of chip supply and precisely controlled acid plant operation materially contribute to better digester operation; that it seems permissible to slightly raise the maximum cooking temperature and shorten the cooking time to obtain a pulp of the same bleachability and physical quality; that the usual Sanders test should be used for all "on and off side" tests, "blow-down and blow" tests, due to contaminating effect of lignin material in the liquor on the Winkler test, and especially, difficulty in ascertaining end point of titration; that control in the usual acid plant and digester house operation is decidedly related to the application of proper instruments; and that probably no single variable is more important in acid plant and digester operation than temperature.

Non-Uniformity of Sulphite Pulp

The title of the fourth paper, scheduled on the program of the Acid Pulping Meeting, was *Some Causes for Non-Uniformity in Sulphite Pulp Manufacture.* It was the subject of O. E. Anderson, International Paper Co., who pointed out in it that the one per cent caustic soda solubility test affords a reliable, convenient check on wood quality; that both tear resistance and yield decrease with increasing caustic solubility; that variation in pulp quality, as a result of mixing species of wood in the digester, is found to vary—the wood of higher lignin content producing pulp of higher lignin content; that what may constitute a minimum combined SO_2 content in one case may represent a decided excess in another; that a very noticeable drop in tons of chips per digester is noted with an increase in per cent hangups; that a consistent increase in alpha cellulose content of the pulp was found at higher penetration temperatures; and that an attempt made to step up the temperature to 130 deg. C. in less than 30 minutes resulted in incomplete penetration as evidenced by brown-centered chips.

Wood Quality Most Important Variable

The subject of the next paper was *One Phase of the Effect of Wood Quality on Sulphite Pulp.* This paper, presented by Vance P. Edwardes, International Paper Co., was based on a study of past records in a mill producing the same quality of easy bleaching sulphite from, in general, the same wood sources. The study revealed, according to Mr. Edwardes, the one escapable fact that wood quality is the most important single variable affecting pulp quality and that of the final product, paper, and it is also the one most frequently overlooked.

Removal of Ether Soluble Material

The sixth paper scheduled before the group meeting on Acid Pulping was entitled *A Study of the Ether Soluble Material in Sulphite Pulp from Southern Pine.* This paper, presented by Charles Carpenter, Chemist, Pulp and Paper Laboratory, Savannah, Ga., revealed that sulphite pulping of the unseasoned sapwood of loblolly, longleaf, and slash pines removes approximately 60 per cent of the ether soluble material present initially in the wood; that blow pit washing and lapping of the stock on an Oliver filter affects the removal of an additional 20 per cent; that the lapped pulp contains from 1 to 2 per cent of ether soluble material; and that the refining or bleaching of such pulp is liable to be accompanied by pitch difficulties.

When a dilute suspension of unbleached pulp containing 1 to 2 per cent ether soluble material, however, is passed over an inclined wire one or more times, the ether extract, stated Mr. Carpenter, is reduced to 0.6 per cent or less, and a pulp is obtained that may be refined or bleached with reasonable immunity from pitch difficulties. The reduction in extractable material, he added, entails a fiber loss of 2 to 6 per cent and the use of 30,000 to 100,000 gallons of water per ton of pulp. He also pointed out that the white water contains ray cells, epithelial cells, fragments of fibers and considerable dirt and that approximately 20 per cent of the effluent is soluble in ether. Mr. Carpenter further stated that both the ether soluble material of the effluent and the ether soluble portion of pine sulphite pitch are dark brown, viscous oils; that the oils have iodine, saponification and acid numbers of the same order; that the oil from the effluent consists of approximately 70 per cent fatty acids, 7 per cent resin acids, 7 per cent insaponifiable matter, and 1 per cent glycerol; that the fatty acids are principally of the unsaturated type; and that calcium and sulphur are present only in traces.

Simplified Method for Analyzing Bisulphite Cook

A joint paper by D. T. Jackson and John Parsons, both of the Hammermill Paper Co., on *A Simplified Method for the Analysis of Bisulphite Cooking Liquor* completed the program of the Acid Pulping Meeting.

Scheduled for presentation by title, it covered the use of purified sodium chlorite as a chemical reagent in sulphite cooking liquor analysis—the complete analysis, total, free and combined sulphur dioxide being carried out on a 5 cc. sample without dilution.

Paper Coating Meeting

John Traquair, Director, Research Department, Mead Corporation, presented the first of four papers before the Paper Coating Meeting. His paper covered *Paper Coating Process Developments*, and in his remarks he stated in part that the development of paper coating paralleled the development of printing; that the first coating machines were of German origin; that America could claim the development of the first two-sided coating machine; that up to the World War, papers were coated heavily, coating being cheaper pound for pound than raw stock; and that demands of printers brought about the development of more efficient coating methods.

In continuing his remarks, Mr. Traquair said that brush spread and festoon drying was until 1920 the almost universal method of coating in use. He then referred to the knife edge process in which spreading was accomplished through the use of half-round rolls that could be adjusted while the machine was in operation and to the more recent development of roll spreading. The smaller the diameter of the roller, said Mr. Traquair, the finer the spread.

Mr. Traquair stated further that perfect results were obtained by speeding the roll to a high degree without oscillation; that in his opinion the physical condition of the coating color at the moment of spread is the major factor in determining roll speed; and that, for good results, color coming to the roll must be fairly fluid. He also mentioned that the first production unit of this type of coater was an 80 in. paper machine that had been rebuilt for the purpose; that after this machine had been in operation for a number of years that a 100 in. roll coating machine was installed and that this second machine has operated for more than a decade with no major change in its design.

Mr. Traquair likewise called attention to the air-knife coater and to the Massey patents. He then stated that coating on the paper machine was being developed slowly; that the final result or value of any of the processes lies in machine efficiency and in the printing quality of the coated paper; that the paper must meet the use requirement of the customer; and that raw stock color is important.

Enzymes and Paper Coatings

R. A. Diehm, Rohm and Haas Company, Inc., presented the second paper before the Paper Coating Meeting. His subject was *The Use of Enzymes in the Preparation of Paper Coatings.*

Mr. Diehm defined enzymes as biological catalysts; stated that enzymes may effect hydrolysis, oxidation, reduction or even coagulation; commented that the conversion of starch with enzmyes is a flexible process; and said that the use of enzymes not only enables the coating man to produce starch coatings of the highest quality, but to do this at the lowest possible cost.

The practical handling of enzyme casein conversion, continued Mr. Diehm, is quite similar to that of the starch conversion. In this connection, he stated that enzyme hydrolysis of casein in coatings can be employed to raise the percentage of solids, keeping the viscosity and fluidity of the coating mixture the same.

The chief value in raising the solids of the coating mixture, said Mr. Diehm, is to obtain quicker drying coatings. He likewise mentioned that in a different type of casein coating, the adhesive efficiency of the casein may be increased by the use of enzymes.

The Use of Lacquers

The next paper on the program, entitled, *Lacquered Papers*, was presented by W. D. Bowlby. Mr. Bowlby related that man-made lacquer was discovered by a French professor during the past century; that 40 odd distinct types are available; that France also was the birthplace of nitrocellulose lacquered papers; that a study of the patent literature reveals the rapid stride of lacquered papers; that false opinions on fire hazards in the use of lacquers still exist; that 5,000 cubic feet of air per gallon of lacquer is a safe figure; that a minimum amount of lacquer should be exposed at any one time; that a lacquer film takes on the characteristics of its support; that good lacquer is odorless, fast drying and smooth; that dyes, waxes, pigments, etc., give special characteristics to lacquer; that roll-type coaters are generally employed for coating with lacquer; that thickness of coating depends largely on requirements; and that 1 gallon of lacquer can be expected to cover 300-4000 square feet of surface.

In the discussion which followed the presentation of Mr. Bowlby, mention was made of a solventless lacquer that was said to have made real headway during the past year.

Starch in the Paper Industry

The last paper of the morning session of the Paper Coating Meeting was presented by Irving Saxl on *Some Aspects of Starch in the Paper Industry.*

Mr. Saxl referred to the somewhat limited use of starches in the paper industry; said that they were seldom used alone but were combined with glue and casein; introduced the term of non-metallic alloys for paper and other similar materials; suggested that starch is a natural product; commented that hydrolyzation does not attack all granules alike; and stated that pH and many other factors affect the adhesive properties of starch. The viscosity test, he said, is inadequate as a criterion of binding strength unless it is corroborated with other tests.

Joint Session—Graphic Arts and Paper Coating

J. J. O'Connor opened the Graphic Arts and Paper Coating Meeting on the afternoon of the second day by calling upon Miss R. M. Cobb, Lowe Paper Company, to present her paper upon *What May We Expect of Starch?*

Simple Strength Tests for Starch Solutions

Miss Cobb, after stating that starch is more interesting to the papermaker in its physical than in its chemical properties and giving its specific gravity as about 1.64, described a simple method for testing the strength of beater starch. This method consisted of forming hand sheets in a sheet mold out of free sulphite stock and starch solutions of different strengths. Starch, acting like highly hydrated cellulose, increased the water content of the wet pressed sheet before drying. It was pointed out, however, that the contracting power of starch in a sheet, up to a certain point, can offset the greater water content of the wet pressed sheet. The method also revealed that starch is not stronger than cellulose and that its seemingly apparent action is one of binding fiber to fiber.

In summarizing her remarks, Miss Cobb stated that it seems as if about 0.5 per cent of a slightly treated starch should be imparted to the paper to get the most for our money.

Starch Products Evaluation

J. P. Strasser, Stein, Hall Manufacturing Company followed Miss Cobb with a brief abstract of his paper upon *The Evaluation of Starch Products in the Beater and Tub.* Mr. Strasser cited a retention method procedure developed by T. A. Pascoe, H. E. Nelson and C. A. Lightfoot and stated that it seems to have considerable merit. He also called attention to the work on starches that has been done at the Institute of Paper Chemistry, one report of the Institute to which reference was made stating that "Tapioca is much better in Mullen and in double fold, but corn is better in retention." Data also was submitted on work that is being done at the Institute on the evaluation of starches for tub sizing and certain aspects of this data were discussed. Among the points touched upon in discussing the data were basis weight, Mullen factor, apparent density, folding endurance, porosity, smoothness, tear, surface sizing, brightness, pick test, pen and ink test, and the turpentine flotation test.

Upon the completion of Mr. Strasser's remarks, Mr. O'Connor turned the meet-

ing over to Mr. Nickerson, who, in turn, turned it over to Mr. Clarkson.

The Use of Aniline Machines

Mr. Clarkson then called upon J. B. Shaughnessy, Manager, Rubber Printing Products Division, American Wringer Company, Inc. for his paper on *Aniline Machines and Their Uses.*

Mr. Shaughnessy called attention to the great and constantly increasing demand for papers with designs, trademarks, decorations, or plain staining. He stated that aniline machines of both domestic and foreign manufacture are available and that paper manufacturers and converters can have utmost confidence in them. Mention also was made of a fluid ink that has the same characteristics as aniline ink but is pigmented to give opacity. In many instances, continued Mr. Shaughnessy, lacquer is being used.

Mr. Shaughnessy likewise said that design rolls can be delivered in one week or ten days; that paper can be watermarked with rubber design rolls and an ink which penetrates the sheet without disturbing the fiber and at a fraction of the cost of a dandy roll; and that staining of small quantities of paper can be done extremely well on an aniline machine. He also expressed the opinion that the day is not far off when the aniline machine will be attached to, or become a part of the paper machine.

Aniline Printing

The next paper to be presented was on *Aniline Printing* and was the subject of R. M. Bates, General Superintendent, Thomas M. Royal & Company. In this paper, Mr. Bates stated that aniline printing is widely used in the production of bread wraps, confectionery wraps, paper bags, paper milk containers, cellophane bags and wraps, foil bags and wraps, bottle wraps and gummed tape. He also described the aniline press.

In his description of the aniline press, Mr. Bates said that a two-color rotary machine accommodating a web 30 inches wide will weigh less than 1,000 pounds and occupy 10 or 12 square feet of floor space; that such a machine, equipped with anti-friction bearings, will run up to 700 feet per minute on 3 hp. when the nature of the work permits; that aniline presses were at first used exclusively for printing in conjunction with some other operation, but recently it has become desirable to run printed rolls for direct sale, or for subsequent treatment, such as waxing; that any press can be equipped with slitters; that efficient sheeters are also available; and that compressed air is the only satisfactory means of drying between colors but gas is best for final drying.

Further remarks by Mr. Bates revealed that rubber is the only common substance which will carry aniline ink in a manner adaptable to the usual needs of aniline printers; that rubber plates for printing were patented in the United States in 1853 but were little used until the introduction of the Jean Berte process in 1926; that base colors are the most economical for use in aniline inks; that shellac is the most suitable of all resins for use as a binding vehicle in aniline ink; that solvents are needed to put both dye and vehicle in solution, and, having done their job, to disappear; that white aniline ink, made from titanium, may be added to colored aniline ink to opaque it; that white ink can be used as a printing color; and that many complex inks, such as gold and silver, may be formulated but complexities arise in the handling rather than in the manufacturing of such inks.

Printing Takes Moisture from Paper

The Graphic Arts and Paper Coating Meeting closed with a paper by C. J. MacArthur on *Physical Properties of Paper Best Suited for Speed Drying Inks.* Mr. MacArthur called attention to the competition of letter press by offset, rotogravure and radio; stated that the handicaps of letter press are make-ready; off-set and smut; said that for hundreds of years printing was done without make-ready; and commented that the old fashioned, skilled pressman cannot be overlooked in letter press printing.

Mr. MacArthur likewise said that ink dries by oxidation, evaporation and penetration; that cobalt is the most potent dryer known to ink chemists; and that about 35 per cent of the moisture in paper is removed in the printing process—the removal stopping when the sheet reaches a moisture content of 3.2 or 3.5 per cent.

Stuff Preparation Group Meeting

Five papers were scheduled for presentation before the Stuff Preparation Group Meeting on the second afternoon of the convention.

Devices for Controlling Freeness and Consistency

The first of these papers, entitled, *Automatic Freeness and Drainage Control,* was the subject of R. D. Kehoe, President, Paper and Industrial Appliances, Inc. In this paper, Mr. Kehoe described a number of freeness and consistency devices that aid in controlling uniformity of stock delivered to the paper machine. Mention was made of the Schopper, Green, Williams and Moschman freeness testing instruments and of the apparatus developed by French, Witham and Harvey for continuous testing from continuous flow, Mr. Kehoe stating that apparently a great deal of this work was anticipated by M. O. Schur of Berlin, N. H. Mr. Kehoe then referred to U. S. Patent No. 1,653,125 that was issued to Mr. Schur on December 20, 1927, and assigned to the Brown Company, Berlin, N. H. This patent, he said, not alone dealt with apparatus and method of continuous testing but there seems to be included in the claims allowed the method or means of any form of automatic control or reaction from freeness reading to jordan plug, beater roll, and bedplate control, in fact, any possible means of automatically changing adjustments of stock treating equipment so as to deliver stock of uniform freeness to the paper machine.

Reference then was made to the Quinn continuous freeness tester and to the Schur consistency control. The Quinn continuous freeness tester, designed by Robert G. Quinn and Geo. W. Dodge, uses actual wire drainage of paper machine to control adjustment of jordan plug, refiner or beater. The Schur consistency regulator, designed without springs, floats, etc., registers consistency change by viscosity change by means of two revolving steel eggs, same being adjustable to the submersion desired or "spread" for best results on different stocks.

The industry, continued Mr. Kehoe, is indebted to D. E. Lewellen for practical development and mill usage of a jordan control device, a device that not only maintains uniform hydration and uniform load on the jordan motor but also much more uniform wear on the jordan blades.

Stress was placed on the use of the term, "wire drainage" control, instead of "freeness." Mr. Kehoe in emphasizing this point stated that in many of our mills today a freeness tester is not used at all since from a mill operating viewpoint it is utterly misleading.

Data on the Vortex Beater

The second paper was entitled, *The Vortex Beater.* This paper was presented by D. B. Wicker, Chief Chemist, Thilmany Pulp and Paper Company.

Mr. Wicker said that the mill beater served as a disintegrator, mixer and mechanical treater. He described the Vortex beater as an engine designed with the principle of the screw press utilized for disintegrating and forcing the stock into the zone of action, and that of the centrifugal pump for circulating. He also presented test data comparing the action of a Vortex with steel fillings and one with stone fillings with that of a hollander with a granite bedplate. Likewise, Mr. Wicker gave comparative test figures on the refined stocks and on power consumption.

Capacities and Settings for Disc Refiner

The third paper, entitled, *The Control of the Refining Action of Discs,* was presented by D. Manson Sutherland, Jr., Consulting Engineer. Mr. Sutherland stated that it has been demonstrated that it is quite practical to discharge as much as 100 tons per day of sulphite, sulphate, and soda pulp at 3 per cent consistency through discs with a gap of 0.003 of an inch; that close clearances are necessary to obtain freeness drop and strength development in all types of beaters and refiners when the time factor is considered but it is still more important in a single pass refiner where the stuff properties must be developed in less than a second; that freeness

drops of approximately 100 cc. on raw sulphite can be obtained at a gap of 0.030, 200 at 0.020, 300 at 0.005, and 500 cc. at practically zero; that the main difference between the modern art and the prior art used in attrition mills or any other type of refiner is the restriction of capacity at the discharge end of the refining tackle; and that during the past year single disc refiners have been used to refine sulphate pulp in its own liquor at 180 deg. Fahr. at the rate of over 100 tons per day per refiner without experiencing any difficulty with foaming either in the refiners or on the washers.

Beater Formulae Compared

The fourth paper scheduled for presentation before the Stuff Preparation Meeting was a paper by F. M. Dietz on *A Summary of Fundamental Formulae for Impact and Contact Inches as Presented by Different Authors.* Mr. Dietz not only cited several formulae but briefly discussed the history of each one of them. Among the formulae that he cited were the following:

Impact Inches per Minute
(Bidwell & Sutherland)

$$L \times N_1 \times N_2 \times R.p.m. = \text{impact inches per minute.}$$

where L = developed length of bars in shortest member of refiner.
N_1 = number of bars in one member.
N_2 = number of bars in the other member.
R.p.m. = revolutions per minute.

Cutting Length (Smith)

$$\text{Cutting length} = M^v \times M^s \times L \times \frac{N}{60}$$

where L = length of face (width) of roll in meters.
M^v = number of flybars.
M^s = number of bedplate bars.
N = number of revolutions per minute of the roll.

Cutting Power (Milne)

$$N_1 \times N_2 \times L \times R.p.m. = \text{cutting power.}$$

where N_1 = number of bars in roll.
N_2 = number of bars in bedplate.
L = length of bars in roll in inches.
R.p.m. = revolutions per minute.

Contact Inches per Minute
(Sutherland & Bidwell)

$$L \times N_1 \times N_2 \times W \times WF \times R.p.m. = \text{contact inches per minute.}$$

where L = developed length of bars in the shortest member of either the rotating or stationary part in inches.
N_1 = number of bars in one member.
W = width of bars in rotating member in inches.
N_2 = number of bars in other member.
WF = width factor = width of bars in stationary member in inches divided by one inch.
R.p.m. = revolutions per minute.

Beating Surface per Second (Smith)

$$\text{Beating surface per second of beaters} = M^s \times M^v \times L \times \frac{N}{60} \times (S^s + S^v)$$

where M^v = number of flybars in roll.
M^s = number of bedplate bars.
L = width of roll in meters.
N = number of revolutions per minute of the roll.
S^s = thickness of the bedplate bars in meters.
S^v = thickness of the flybars in meters.

The last paper scheduled for presentation before the Stuff Preparation Meeting was a paper by G. N. Collins on *Suggested Evaluation Procedure for Comparing Hydrators and Refiners.* The paper was presented by title.

Morning Sessions of Third Day

As in the case of the second morning of the convention, two group meetings were held on the morning of the third day. One of these meetings was a group meeting on Pulp and Paper Testing; and the other was on Heat and Power.

R. G. MACDONALD
Secretary-Treasurer

Professor W. O. Hisey, New York State College of Forestry, presided at the Pulp and Paper Testing Meeting; while A. G. Darling, General Electric Company, was in charge of the meeting on Heat and Power.

Session on Pulp and Paper Testing

A paper by James d'A. Clark, Engineering & Technical Manager, Scott Paper Company, entitled *Concerning the Interpretation of Pulp Tests* was read by K. W. Britt. This paper emphasized the importance of the effect of ultra fine materials in pulps which is usually lost during testing—the properties of whole pulps, (especially groundwood), it was stated, being profoundly and beneficially influenced by material so fine that it passes through a 150-mesh wire. The very finest material, or flour, which commonly used to be held to be undesirable, proves, in most cases, according to Mr. Clark, to be very valuable. The satisfactory correlation of various freeness testers, because of this loss of fines, it was suggested, appears impossible. The specific volume of test sheets was shown to be an extremely important modifying factor for test results in general. Mr. Clark suggested that a much better understanding of true pulp qualities can be gained with the aid of the specific volume test than with test results as usually presented.

Effect of Atmosphere on Colored Papers

The second paper scheduled for the Pulp and Paper Testing Meeting, a joint paper by O. T. Chalon and F. A. Soderberg, Chemical Engineer in charge of Paper Laboratory, General Dyestuff Corporation and Chemical Engineer, General Dyestuff Corporation respectively, entitled *Absolutely Fast to Light* was presented by Mr. Soderberg.

The paper revealed the results of a preliminary investigation to determine the effect of atmospheric conditions upon the fading of colored papers, the relation between fade-ometer and sunlight tests, and the exposure limits within which dyestuffs used in the paper industry range from poor to excellent fastness to light. The investigation showed that dyestuffs react individually with atmospheric changes. It likewise was stated that some types of sulphite which have been overbleached have a tendency to change shade rapidly in sunlight; that groundwood, kraft and the poorer grades of unbleached sulphite offer practically no defense to fading; and that fillers and starches may either improve or retard the fastness of colored papers.

Three varieties of fadings were listed; namely, loss of depth or intensity without any considerable change of shade; darkening of shade and accompanying loss of brilliancy; and a decided change of hue, for instance, from a purplish blue into a greenish blue.

The term *absolutely fast to light* as applied to paper, in the opinion of Mr. Chalon and Mr. Soderberg, is a misnomer.

Four Other Papers Presented

Other papers scheduled for presentation before the Pulp and Paper Testing Meeting included the following: *The Calculation of the Spectral Reflectivity of Dyed Paper*, by Philip Nolan; *The Specification of Light Scattering Materials*, by D. B. Judd, Bureau of Standards; *A Quantitative Test for Soap Wrap Paper*, by T. L. Crossley, Consulting Chemist; *The Discoloration of Soap Wrap Paper*, by W. R. Keating, Student, University of Toronto; and *Tests for Smoothness, Porosity and Printability of Paper*, by F. M. Williams, President Williams Apparatus Company.

The paper by Mr. Nolan was presented by title. This was also the case with the paper by Mr. Keating.

The paper by Mr. Crossley described a test for soap wrap paper in which the reagents are bichromate of potassium 0.25 grams per liter; Congo red 1 per cent (Eastman Kodak, E. K. 770), and normal caustic soda. Likewise, the apparatus and procedure for making the test were listed and information given as to results—the results being stated as quantity of bichromate—Congo red required to match tint of decoction, expressed as cc.

Heat and Power Session

A joint paper by J. L. Rylander and M. R. Lory, both of Westinghouse Electric & Mfg. Co., on *Some Important Considerations in the Design of Electrical Machinery for Paper Mills* was presented by Mr. Lory.

Mr. Lory pointed out that machines for the paper industry must be designed with characteristics suitable for the loads to which they are supplied and they also must withstand the special operating conditions encountered. He said that the operating requirements for motors and generators in paper mills are somewhat different from those in other industries; that large quantities of moisture and chemical fumes are present; that machines operate twenty-four hours a day and seven days a week; that many motors are started with full voltage by means of across-the-line starters; and that some applications are such that vibration exists.

Whenever a motor is located so that water or other liquids may drip on it or be splashed on it, he continued, the type of frame or enclosure should be such that the liquids will not get on the windings. Drip-proof, splash-proof and totally-enclosed, fan-cooled types, commented Mr. Lory, are especially common in ratings up to about 200 hp.

Emphasis then was placed upon two types of insulation, the type applied to smaller a. c. motors, such as those up to approximately 50 hp., and the type applied to larger motors, a. c. motors of approximately 50 hp. or larger. He stated that materials are used which absorb a minimum quantity of moisture, and absorb this small quantity at a very slow rate. He explained the insulation applications for varnish treated cloth cemented to the toughest paper obtainable and for mica. Mica insulation, he said, is especially suitable for paper mill service because of its high dielectric strength, and because it is unaffected by moisture, acid or alkali fumes and by any temperature that occurs in motor operation.

Mr. Lory also mentioned that bearings require little care, if they are serviced at the proper time; that the same is true of windings, but it is a little more difficult to find out when they need care and to determine what should be done; that machines standing idle, particularly old motors in which the varnish is no longer effective, absorb moisture quite rapidly; and that direct current machines which operate continuously at full load for long periods must have commutators that stay put, proper machine proportions and interpole design, and well built brush rigging if commutation trouble is not to develop.

In concluding his remarks, Mr. Lory gave a few typical examples of motor applications to pulp and paper mill drives—chippers, jordans, beaters, and vacuum pumps. He stated that the synchronous motor is used widely for both chipper and jordan drives; that the high inertia of the chipper rotor imposes most severe duty on a synchronous motor; that the chipper is a good example of a load not generally suited to resynchronizing because the motor usually applied to it cannot pull in the high inertia of the chipper if the load is still on; that some trouble in the past has been experienced with bearings on motors driving jordons; that beaters may be driven by either induction motors or synchronous motors; and that motors are either belted or direct-connected to vacuum pumps—the direct-connected drive making a very compact installation.

Flakt Pulp Drying System

The second paper of the session was presented by Harald A. Erikson, Svenska Flakfabriken, Stockholm, Sweden. His subject was *The Flakt System of Pulp Drying*. The system as explained by Mr. Erikson dries the pulp through an accurate control of temperature and humidity. Numerous European installations of the system were mentioned, and one installation on this side of the Atlantic was cited. The possibility of utilizing the system for the drying of paper also was touched upon.

Paper Drying Theory

A second joint paper presented before this session was a paper entitled *A Theory of Paper Drying*. The paper, prepared by E. Cowan, Assistant Engineer, Lake St. John Power & Paper Company, Ltd., and B. Cowan, Manufacturing Department of the same company, was presented by the senior author.

The authors developed theoretical formulas for predicting the performance of paper-drying machines and compared the results obtained by using these formulas with representative machines now in use. Both the theory behind the formulas and the actual derivation of equations was gone into in some detail. It was pointed out that practically all the heat of vaporization is liberated after the sheet leaves the dryer; that the first two or three dryers heat the moist sheet to the evaporation temperature; that the rate of water evaporation must be such that steam in the sheet escapes without injuring formation; that air as it leaves the dryers will be about 140° Fahr. and have a relative humidity of from forty to fifty per cent; that radiation from the hood itself may cool this air to around 120° Fahr. and increase its relative humidity to seventy or eighty-five per cent; and that, in a given machine, operating with a fixed number of dryers, any variation in speed must be met with changes in dryer temperature if the final dryness of the product is to be maintained the same.

Power Requirements and Heating and Ventilating Report

The program of the Heat and Power Meeting also included a paper by H. W. Rogers on *Power Requirements for Paper Machinery* and a report by A. E. Montgomery, Engineer, J. O. Ross Engineering Company as Chairman, TAPPI Heating and Ventilating Subcommittee. This report *Heating and Ventilating Developments 1936-7* was presented by title.

Election of Officers

A general session was called at 12:30 P. M. on the third day of the convention for the purpose of electing officers. Grellet N. Collins, W. R. Maull, and R. G. Macdonald were re-elected unanimously as president, vice-president and secretary-treasurer, respectively; and John Traquair, and W. N. Shoemaker were elected unanimously as members of the executive committee, succeeding G. W. E. Nicholson, Southern Kraft Corporation and H. V. Kiely, American Writing Paper Company.

The general session, adjourning immediately after the election, was followed directly with the annual luncheon.

Luncheon Address on Social Security

The guest speaker at the luncheon was Roderic Olzendam, Director, Social Security Bureau, Metropolitan Life Insurance Company. The subject of his address was *Some Ideas on Social Security.*

At the outset of his remarks, he said that his talk was in the way of an experiment; that he would try to be a catalytic agent; that he would drop several ideas into the mental test tubes of his audience; and that his experiment would be a success if his remarks served in the least degree to clarify individual thinking and to straighten out personal philosophy in the matter of Social Security.

He mentioned the common interests of men and women the world around and clinched his point by quoting Rudyard Kipling—There is neither East nor West, Border nor Breed, nor Birth, when two strong men stand face to face, though they come from the ends of the earth.

Attention was called to the desire on the part of men and women to be left alone, to be free, to come and go as they see fit, to earn an income and to provide against unemployment, death, illness and old age. Man has striven for Social Security in its very broadest sense, said Mr. Olzendam, as he has come up from the depths of slavery and serfdom.

Social Security then was compared to a wheel supported by three spokes—one spoke being designated as material security, a second as mental and spiritual security; and the third as national security. The Federal Social Security Act passed by Congress in 1935, he said, citing old age pensions, old age assistance, and unemployment compensation, is intended to strengthen material security.

Old age pensions, old age assistance, and unemployment compensation, each considered separately, were then explained. Intimating that this Social Security Act is a great step forward in the attainment of material security, Mr.

Olzendam stated with emphasis that this measure must be supplemented and complemented by the efforts of individuals expressed in savings, in insurance, in investments, in home ownership, and in similar channels.

Social insurance, life insurance, home loan societies, savings institutions, and thrift agencies in general, he continued, have been living together quite happily for the past twenty-five years in Great Britain.

Government can compel industry, commented Mr. Olzendam, to furnish a minimum of material security, but it rests largely with the individual corporation to supply those other spiritual and mental elements indispensable to making material security take on the proportions of a vital and living social security.

In continuing his remarks, Mr. Olzendam said that security legislation of the nature described becomes a foundation upon which industry can build; that the problems are still industry's problems and industry must solve them; that men with a sense of security against life's major risks work with an assurance which they do not otherwise have; and that when management puts as much distilled intelligence into human engineering as it does into chemical, mechanical, or financial engineering, astonishing results follow.

Mr. Olzendam drew a word picture of the national security problem, commenting that what we are permitted to do within our own boundaries is important, but we live in a world that is interdependent—as interdependent as the machine room is upon woods operations.

An answer to the problem of social security, concluded Mr. Olzendam, must and will be found.

TAPPI Medal Award

The luncheon address was followed by the presentation of the TAPPI medal to Dr. Clarence J. West of the Institute of Paper Chemistry, the presentation being made by Dr. Harry F. Lewis, also of the Institute.

Dr. Lewis, in making the presentation, first referred to the previous medalists—William Mason, Ogden Minton, Ernst Mahler and Edwin Sutermeister, and then stated in part that today we meet to pay tribute to an anomaly—our medalist is a chemist; that his name is known wherever periodicals on pulp or paper are read; that he is a man who has served the industry loyally, effectively, and without ostentation; that he has held the position of Chairman of the Committee on Bibliography for seventeen years; that during those years he has contributed annual bibliographies on papermaking and since 1927 has compiled annual lists of patents; that he has added greatly to the literature of papermaking by the publication of two large volumes of *Bibliography of Paper Making* covering the period 1900-1935; that he also issued a *Bibliography of Paper Making Materials* in 1921, a revised edition of which was published in 1928; and that he was associated with a Committee on Classification and Definitions of Papers appointed by the National Bureau of Standards in 1921, a report of which was published in 1924, and was editor of the second report in 1928. A good bibliographer, continued Dr. Lewis, is invaluable.

"Members of TAPPI and guests," he added, "it is my privilege to introduce to you my good friend and co-worker, C. J. West, 'C. J.' to you and to me."

Then, as he presented Dr. West with the medal, he said: "Dr. West, it is both my privilege and my pleasure, on behalf of the Technical Association of the Pulp and Paper Industry, to present you with the TAPPI gold medal, this year's award of merit."

Dr. West, in accepting the medal, said that even though he could not see what he had done to deserve it, that he did appreciate the honor very greatly. He then stated that all the previous medalists have had a long list of accomplishments to their credit, and that about all he could do would be to point to two or three books and say: "This is what I have done. . . . The award of this medal, while a high personal honor, is much more significant in that I am accepting it as a recognition, on the part of the Technical Association, of the value of the bibliographic and abstracting service which the Committee has rendered the Association during the past twenty years."

This history of the bibliographic and abstracting work of the Association was then briefly touched upon. He made reference to Henry E. Surface as first chairman of the Committee on Bibliography, and to John D. Rue as the first to be in charge of abstracts. The Committee on Abstracts, he said, was continued as a separate project until 1923. Credit was given to J. N. Stephenson, Editor, *Pulp and Paper Magazine of Canada*, for his effort in keeping the Committee on Abstracts alive, Dr. Rue being called to the colors in 1917, he being succeeded on the Committee by Vasco E. Nuney and later by Ross Campbell.

Dr. West then told how the issuance of the annual bibliography as a separate publication came about; referred to two compliments that have been paid this aspect of the work of the Committee—one by the Technical Section of the Paper Makers' Association of Great Britain and Ireland and the other by Dr. D. E. Cable; expressed his indebtedness to A. Papineau-Couture, who was a member of the Committee in 1920 and has served more than faithfully ever since; and gave recognition to R. G. Macdonald, Secretary of TAPPI and to H. J. Berger, Editor of the *Paper Trade Journal* for their assistance in this work.

In concluding his remarks, Dr. West said: "In accepting this medal, I wish to express to the Technical Association my sincere and heartfelt thanks for its recogniton of the work which the Committee on Abstracts and Bibliography has done, and which I hope it may continue to do in the future."

Fall Meeting at Savannah, Georgia

President Collins then introduced Colonel Butler, Chairman of the Industrial Committee of Savannah, who invited TAPPI to hold its 1937 fall meeting at Savannah, Georgia. Colonel Butler said that he knew that a meeting there would be profitable and asked that some time be given to entertain.

It then was announced by Mr. Collins that the meeting would be held there during the early part of October.

"Bud" Taylor at the Organ

A report of the annual luncheon would be incomplete without mention of "Bud" Taylor. Mr. Taylor, a theater and radio organist in Kalamazoo, Michigan, entertained with an organ program of selections from the "Student Prince." He was brought to the annual luncheon through the courtesy of the Kalamazoo Valley Section of TAPPI.

Two Related Industries

Following the completion of the luncheon program, a motion picture production entitled *Two Related Industries* was presented through the courtesy of F. C. Huyck & Sons. This production, requiring forty minutes to show, cleverly portrays how felts are made—a process that should be of interest to any technical or operating executive within the pulp and paper making industry.

The showing of *Two Related Industries* completed the formal program of the convention for the third day.

Sessions of Fourth Day

The morning of the fourth day of the convention was given over to two group meetings, one on Paper Testing, with B. W. Scribner, Bureau of Standards, presiding, and the other on Paper Manufacture, with G. D. Bearce, Maine Seaboard Paper Company, presiding. The Paper Testing meeting was in the form of a round table discussion; while the meeting on Paper Manufacture was given over to a formal presentation of papers.

Two meetings also were held during the afternoon of the fourth day of the convention. One was a group meeting on Paper Manufacture and Waste that was presided over by F. C. Clark; and the other was on Alkaline Pulping with H. R. Murdock presiding.

Paper Testing Round Table

Testing the Water Vapor Permeability of Paper was the subject up for discussion before the Paper Testing group. Those active in the discussion included F. T. Carsons, Bureau of Standards; G. J. Brabender, Marathon Paper Mills; R. L. Taylor, Bell Telephone Laboratories; F. Fillius and F. J. Hopkinson, Eastman Kodak Company; A. G. Scroggie, E. I. duPont de Nemours & Company; Allen Abrams, Marathon Paper Mills; and Pierre Drewsen, Hinde & Dauch Paper Company.

Mr. Brabender told of the work of the subcommittee; and then briefly de-

Annual luncheon of the Technical Association of the Pulp and Paper Industry Held at the Waldorf Astoria Hotel

scribed the method for testing the water vapor permeability of paper as originally used and cited the improvements of the past several years.

The Vapometer as originally developed, stated Mr. Brabender, was a light aluminum cup to the top of which was fitted a clamping ring that was attached to it through the use of four screws. To make a water vapor permeability test with the instrument, 50 cc. of water were placed in the cup; then a sheet was placed across the top of the cup and clamped into position with the clamping ring; then the assembly was weighed and placed in front of a fan in a constant temperature and humidity controlled room and left for a time; and finally the assembly weighed again. The work done with this instrument indicated leakage through the clamping edge. This leakage prompted the development of an improved design of Vapometer in which the clamping arrangement was altered considerably.

Mr. Taylor commented that the Bell system was interested in the permeability of thin flexible membranes through which speech can be transmitted. He mentioned Ohms law and gave several linear diffusion equations which he said would be different for absorbing materials.

Mr. Fillius reported on work done with the Vapometer. He said that paraffine had been applied to edge of instrument to minimize edge leakage; that the method was prohibitive as a control procedure for materials of slow permeability; that the rate of diffusion could be increased by passing dehydrated air over test sample; that present instrument is too heavy for the analytical balances now in use; that rate of loss is increased by raising level of water in cup; and that blotter sealed in sample brings moisture to surface and decreases time of test. Mr. Fillius suggested that the weight of the instrument be decreased to come within the scope of the average balance; that the seal around the edge be improved to decrease edge loss; and that the instrument be decreased in size to bring the water within the cup nearer the test sample.

Mr. Hopkinson discussed the use of the instrument for the testing of relatively impermeable membrances, such as cellulose acetate, and said that magnesium perchlorate was used for a dehydrate.

Mr. Scroggie said that he was concerned with rapid practical tests; that the seasoning period extends from a few minutes to a few days depending on length of test; and that permeability period can be very short if proper conditions are selected to make the test.

Mr. Abrams referred to the diversified comments which had been made; mentioned how helpful they should be; and stated that information now available will allow the tentative method to be standardized.

Mr. Drewsen told of efforts some years ago to measure vapor transmission through sealing dry calcium chloride in an envelope of paper to be tested and then suspending this envelope over water in a covered jar—the gain in weight divided by the product of the exposed area and the time giving an evaluation factor; and cited Robert John's method of sealing a circular disk of paper by means of paraffine in a petri dish containing 10 grams of dry calcium chloride and spacing it by means of piston rings.

Based on experience in the laboratory of the mill with which he is associated, Mr. Drewsen suggested a substitution of asphalt for paraffine and of rubber gasket rings for piston rings; recommended the use of template with beveled edge to maintain constant size of exposed area and of mica to facilitate removal of template; and pointed out the possibility of increasing transmission rate by rotation of samples, thereby reducing time necessary to make tests, of using some standard humidity condition, such as 40 or 65 relative, as in conditioning rooms, and of expressing the transmission factor as weight of water per unit area, per unit of time, per degree of relative humidity difference.

Session on Paper Manufacture

The first paper scheduled for presentation before the group meeting on Paper Manufacture was a paper by W. D. Harrison, Riegel Paper Corporation, on *A Study of the Retention of Dyestuffs on Papermaking Fibers Under Various Conditions.* The program also included a paper by Dan B. Wicker, Chief Chemist, Thilmany Pulp and Paper Co., on *The Fundamental Attributes of a Glassine Sheet Which Affects Its Transparency Qualities.*

The rest of the session was given over to the presentation of three papers, namely: *The Cause and Cure of Grainy Edges, Curl and Cockles in Paper*, by E. W. G. Cooper, Crown-Willamette Paper Co.; *Factors Influencing Drainage Through Fourdrinier Wires*, by H. G. Specht, Eastwood-Neally Corporation; and *Wax Emulsions in Surface Sizing Paper and Board*, by R. W. Kumler, Bennet, Inc.

Fiber Characteristics and Papermaking Variables

Mr. Cooper, in his paper, first reviewed the physical characteristics of a number of papermaking fibers and then discussed some papermaking variables before commenting upon the cause and cure of grainy edges, curl and cockles in paper.

Among the contributing factors causing grainy edges, cited by Mr. Cooper, were: formation, badly worn edges of wet felts, slack edges of dryer felts, faulty crowned presses, and induced draft effecting a too rapid drying of edges of sheet and contraction of same in the dryer section. Hard sulphite that offers undue resistance to beating and jordaning, retaining its resiliency, continued Mr. Cooper, will contribute more towards grainy edges than a softer stock.

More efficient drying, in his opinion, would to a large extent help to eliminate grainy edges.

In reference to curl, Mr. Cooper pointed out that inherent curl is usually in the machine direction and that he believes it to be greatly influenced by sheet formation, type of slice, length of fiber, spouting velocity of stock, and the relative speed and pull of the machine wire. A heavily loaded sheet, he said, will be less likely to curl and soft sized papers do not curl as much as hard or medium sized papers.

He suggested that tight draws between the wet end sections of the paper machine be avoided; that wet dryer felts and dryer felts without felt dryers are sometimes putting moisture in the sheet at the dry end; and that sweat rolls used intelligently help to correct this tendency to curl.

Cockles, said Mr. Cooper, are more liable to occur where the stock is more or less hydrated, or where the beating is carried out over prolonged periods. Other causes, that he mentioned, included dirty and water logged streaks in wet felts, poorly ground press rolls, misaligned couplings from drive to bottom press journal, and core gears that bar the rubber rolls and cause them to ripple.

The use of a cross-current circulating system, in the opinion of Mr. Cooper, helps to correct one of the conditions conducive to cockling. He also suggested the use of a good felt conditioner to keep wet felts in shape. Likewise, he stated that sudden drying and extreme change of temperature should be avoided; and that dryer felts should be porous and have sufficient felt dryers to give them the desirable capacity to take up moisture.

Cockles, continued Mr. Cooper, take a different form or shape on the Yankee—instead of being long, they are circular. To avoid cockle or pox spots and impaired finish on a Yankee, he recommends slower drying or the use of pre-dryers to bring the moisture content of the sheet down to 60 per cent before reaching the Yankee.

Factors Influencing Drainage

The paper by Mr. Specht on *Factors Influencing Drainage Through Fourdrinier Wires* revealed that the rate of drainage changes with the acidity of the stuff on the wire; that stock drainage through the wire is at a maximum at a pH of approximately 5.3; that while stock below a pH of 5.3 has a somewhat slower drainage rate, stock at a higher pH shows the most marked drainage decrease; that the rate of drainage is greatly affected by temperature; that there is a critical or maximum pH point for freeness for each type of furnish; that wires can be correlated in regard to freeness; and that the rate of drainage of the stock varies with the wire mesh.

Surface Sizing with Wax Emulsion

Mr. Kumler, in his paper on *The Use of Wax Emulsions in Surface Sizing Paper and Board* reviewed the major patents relating to surface sizing with wax, classified wax emulsions, and commented on application methods.

The first reference to surface sizing with an emulsion containing wax, found in any United States letters patent, he said, is made by Harrington in a patent applied for in 1906 and issued in 1910. He then stated that the earliest description of a process of applying a wax emulsion to the paper web as it passes over the paper machine is given by Clapp in a patent applied for in 1926 and issued in 1931. Other United States patents to which reference was made included No. 1,662,641 to Thomas Hans; No. 1,903,787 to William Lodge; No. 1,915,865—reissue 19,187—to Max Oberdorfer; No. 1,938,790 to E. P. Arpin; No. 1,972,500 to Edward A. Toohey and Earle R. Williams; No. 2,020,328 to Harold Robert Rafton; Nos. 2,044,012 and 2,049,469 to Isador J. Novak; and No. 2,059,465 to Otto Kress and Charles E. Johnson.

The reasons for applying wax emulsions to the surface of paper or board, as given by Mr. Kumler, are as follows: to give a smooth surface or finish, to increase resistance to scuffing and abrasion, to reduce friction between sheets of paper, to produce a water repellent effect, to increase water resistance, and to reduce absorption of printing inks.

Wax emulsions for surface sizing, Mr. Kumler stated, fall into two general classifications, namely: those in which the principal emulsifying agent is a soap base and those which contain some other type of emulsifier such as colloidal clay, sulphonated oil, starch or other hydrophilic colloids. Soap type emulsions, he said, are very sensitive to acids and alkaline earth salts. Non-soap type emulsions, he continued, are less affected by pH and some not at all.

He also pointed out that the two types of emulsions differ materially in the degree to which they penetrate paper—the non-soap type being absorbed to a greater extent than the other.

Mr. Kumler likewise related that it is customary to mix non-soap emulsions with starch to confine them to the surface of paper; that all commercial applications of wax emulsions to paper or board as it passes over the paper machine, as far as he is aware, are made by means of either a size tub or calender water box, the size tub being preferable; and that the use of wax emulsions as an ingredient of surface sizing for reducing the absorption of printing ink has not yet been studied intensively.

Other Papers at Paper Manufacture Session

Other papers scheduled for presentation before the Paper Manufacture meeting were: *Dilecto, A Construction Material for Paper Machine Parts*, by W. R. Huey; *Development and Refinement in Design of Paper Machines*, by G. A. Peterson, Engineer, Rice, Barton and Fales; and *A Flotation Method for Treating White Water*, by Sven Anspach, The Dorr Co.

Some Highlights of Mr. Peterson's Paper

Among the highlights of Mr. Peterson's paper, which was scheduled for presentation by title, were the following: Slices over the wire have taken new form, the latest design being one having a flexible lip, so that adjustments can be made entirely across the sheet to level it.

Table rolls are now nearly always mounted in anti-friction bearings and dynamically balanced.

Rubber covered table rolls are becoming more and more popular.

A maple suction box cover impregnated with tallow, and with the end grain of the wood in contact with the wire has given excellent results.

Dandy rolls of the open end type are coming into general use.

Many shake heads of improved design are available.

Suction rolls are being used more and more in the press sections of paper machines.

Granite rolls are gradually being replaced by the use of rubber rolls, in which particles of granite are embedded in the rubber matrix.

Two recent press section developments have taken place—one a three roll press having the rolls on a horizontal center line and taking the place of two regular presses; and the other an upright housing having a heavy pin on which the swinging arms for two presses are mounted.

Top press roll drives of both the mechanical and electrical type have been used quite considerably.

The tendency has been to use larger and heavier press rolls on machines making pulp.

Dryer sections have been refined by using anti-friction bearings on all rolls, as well as on the dryers themselves.

The tendency on new calenders is to mount the rolls in roller bearings.

Pope type reel is coming into more common use, especially on the slower running machines and on heavy papers.

Both electric and mechanical drives have been refined in design and simplified.

Mr. Peterson also expressed the opinion that progress in refinement and design will go forward very fast in the next few years.

Mr. Anspach in his paper, *A Flotation Method for Treating White Water* described in considerable detail the Adka saveall and its application to white water clarification. This saveall, stated Mr. Anspach, was invented by Adolf Karlstrom, a Swedish engineer, and its operation depends upon the rapid rising of particles loaded with air at reduced pressure. About 150 units of the saveall, he said, are either installed in European mills or on order. He likewise pointed out the following advantages: high efficiency amounting to 95-99 per cent; recovered stock can be returned to mixing box or fan pump without causing variations in weight; and recovered stock has the same value as the stock in this stage of processing.

Symposium on Mill Water Supply

The afternoon group meeting on Paper Manufacture and Waste was in the form of a symposium on mill water supply.

The Significance of Water

Hervey J. Skinner, President, Skinner and Sherman, Inc., presented the first paper. His subject was *The Significance of Water*. In this paper, he stated that a pulp or paper mill uses more water than any other one material; that water having little or no color is essential for the manufacture of any paper, except paper of inferior quality in which color and appearance are of no account; that suspended matter in water is troublesome in the manufacture of paper or pulp because it becomes entangled in the fibers, thus causing spots and other imperfections in the finished product; that the presence of iron in water is most objectionable, since cellulose has the property of absorbing iron and other metals from dilute solutions; that the presence of manganese in the water supply of a paper mill may be exceedingly troublesome; that it is a distinct disadvantage to use hard water in washing pulp, particularly sulphite pulp; and that hard waters are troublesome when sizing with rosin.

The methods of purification, continued Mr. Skinner, will depend to a large extent on the particular water to be used.

The essential features of mechanical filtration, he said, are the addition of a coagulant, a period of settling for the elimination of most of the "floc" formed by the coagulation and filtration through sand filters at a rate considerably in excess of that obtained in an ordinary sand filter where coagulation is not employed. Sand filters, he commented, are of two types—gravity and pressure—the principal difference being that the gravity filter is an open tank whereas the pressure filter is a closed tank. He also mentioned a porous tube filter, known as the automatic tube filter, which consists of a series of tubes made from fused aluminum oxide encased in a steel shell.

Mr. Skinner likewise called attention to the quite general use of chlorine, either as liquid chlorine or as chloramine, for slime prevention; stated that the lime-soda and the zealite processes are the methods most commonly used where softening is necessary; and stressed the importance of water control—pointing out that it is a chemical process and should be under the supervision of a chemical engineer.

Paper Requirements for Water

The second paper, a paper entitled *Pulp and Paper Industrial Requirements*

for Water was presented by Dr. H. C. Schwalbe, Dill and Collins, Inc. It was followed by a paper on *Water Purification to Meet Paper Mill Requirements* by A. S. Behrman, Chemical Director, International Filter Company.

Importance of Water Purification

Mr. Behrman stressed the need for clear water and for water of low color. He cited the danger of corrosion with water of low alkalinity and pH; and stated that both iron and manganese are highly objectionable. Manganese, he said, is much more difficult to remove than iron, the exact method to be employed depending a great deal on the other characteristics of the water and the treatment which these other characteristics make necessary.

Reference was made to the lime-soda and the zeolite processes of water softening—the principal characteristics of a typical water softened by the lime-soda process being said to be high pH, low alkalinity, and typically, a greatly reduced total solids content due to the bodily removal of the calcium and magnesium bicarbonates originally present; while the characteristics of a zeolite-softened water were given as "zero hardness," no substantial change in pH or alkalinity, and no reduction of dissolved salts.

The alkalinity of a water used in pulp and papermaking, said Mr. Behrman, is of importance principally if it is due to calcium and magnesium bicarbonates as this alkalinity will form a precipitate of calcium carbonate and magnesium hydroxide with the residual alkali from the kraft and soda processes, besides having objectionable effects on sizing, dyeing and the like.

Mr. Behrman further stated that it is now possible to control the pH of the water supply of the mill automatically and within as narrow limits as desired; that it is now considered good practice to maintain a residual chlorine content of about 0.5 p. p. m. for slime prevention; that Henderson has recently patented the chloramine treatment of pulp and white water; that activated carbon is the practically infallible remedy for disagreeable odors in water; that the cost of chemicals for coagulation and color removal will usually range from a minimum of about ¼ up to a maximum of about two cents per thousand gallons; and that the cost of chemicals for water softening will range for the most part from about 1.5 to 5 cents per thousand gallons.

Standard Methods and Water Standards

The last formal paper to be presented as part of the symposium on mill water supply was entitled *Standard Methods and Water Standards* and was the subject of Harry E. Jordan, Secretary, American Water Works Association.

Among the outstanding remarks made by Mr. Jordan in his paper were the following:

It is within the space of less than a century that we have travelled the distance from an altogether empirical basis of determining water quality to the present state of reasoned knowledge.

The report of G. W. Fuller's investigation of 1895 (a study of water treatment methods at Louisville, Ky.) contains one of the first assemblies of chemical methods for water examination that is couched in modern terms.

The first edition of *Standard Methods of Water Analysis* was issued in 1905.

Revisions of the first or 1905 text appeared in 1912, 1917, 1920, 1925 and 1933. The eighth or current edition appeared in 1936 and plans now look forward to the 9th edition in 1941.

The present edition is divided into seven standard methods sections and two provisional methods sections. The standard sections cover sanitary chemical methods, mineral examination methods, sewage methods, sewage sludge methods, microscopical methods for water, microscopical methods for bottom sediments and bacteriological methods for water and sewage. The provisional methods sections include in one section the water and sewage methods and, in the other, methods for the examination of swimming pool water.

In the last ten years the water supply field has become newly taste and odor conscious and has developed methods of taste improvement.

In so far as the control of water supply in industrial processes is concerned it would appear that more is to be gained by the conformance with nationally standardized technic than by the preparation of special methods for that industry alone.

Very frequently snap judgment will be taken to the effect that water is responsible for some change in processing results and upon careful investigation it will be found that some other material entering the process has been changed and is affecting the results.

Alkaline Pulping Meeting

The Alkaline Pulping Meeting was opened with the presentation of a paper by F. J. Lammers, International Filter Company on *Continuous Causticizing System at Crossett Paper Mills.*

Mr. Lammers stated that the system provides cooking liquor for 170 tons of pulp per day rated capacity with a minimum of 10 per cent reserve capacity for peak periods, on the basis of 150 cu. ft. of green liquor and 100 cu. ft. of white liquor per ton of pulp; that approximately 1730 sq. ft. of settling area —10.3 sq. ft. per ton of pulp per 24 hours—are provided for the settling of slime and dregs from raw green liquor; that practically all the clarified green liquor is used in slaking the causticizing lime; that there is a retention period in the slaker of from 30 to 33 minutes; that the slaker is followed by three continuous causticizing tanks, placed in series to prevent short circuiting and with discharge controlled in automatic proportion to the initial green liquor flow; that approximately 1500 sq. ft. of settling area, equivalent to 9 sq. ft. per ton of pulp per 24 hours, is provided in the white liquor settler; and that the wash slurries of green liquor dregs and the caustic lime sludge are each settled in an individual settler of the same size and construction as the white liquor settler which they adjoin.

Attention also was called to the use of a vertical lime calcining furnace for the burning of the calcium carbonate sludge —a furnace 38 ft. overall height by 22 ft. diameter and having eight superposed horizontal hearths.

The causticizing department including the area occupied by the lime kiln, said Mr. Lammers, occupies a total space of approximately 40 ft. by 145 ft. This space, he continued, includes room for a future 100 per cent increase in slaking and causticizing capacity. The present capacity, he said in conclusion, represents a saving of almost 40 per cent in ground area over former systems and provides greater control and convenience in operation, shorter conveyor runs, and more accessible piping connections.

Kraft Lime Mud Makes Good Sulphite Acid

A joint paper by Dr. Otto Kress and Eugene H. Williams, Technical Director and Graduate Student respectively, Institute of Paper Chemistry, on *The Utilization of Kraft Lime Mud for the Preparation of Bisulphite Cooking Liquor* was presented by Dr. Kress immediately following the presentation of Mr. Lammer's paper. The paper, based on an experimental investigation, showed that sulphur dioxide was absorbed by kraft lime mud at a suitable commercial rate to produce bisulphite cooking liquor of normal strength; that sawdust could be used to filter the prepared cooking liquor; that pulp produced from kraft lime mud liquor was comparable to pulp produced from normal liquor in strength, bleachability, chemical contents, and dyestuff absorption; that the small fraction of the lime mud which was insoluble in bisulphite liquor was composed chiefly of wood, carbon, and sand; that most of the iron in the lime mud went into solution in bisulphite liquor, but the sulphur, which was formed in the reaction, was precipitated and was filtered off, and that a saving on raw material of approximately $0.70 per ton of sulphite pulp might be attained by using kraft lime mud for the preparation of bisulphite cooking liquor.

Sulphate Mill Engineering Facts

The third paper on the program for presentation before the group meeting on Alkaline Pulping was a paper by D. G. Moon, Chief Engineer, Union Bag and Paper Corporation on *Practical Aspects of Recent Kraft Mill Developments.* The major improvements, Mr. Moon said, will be found generally to apply to controlled cooking methods with application of circulating systems and indirect heating with return of condensate to the boilers; to recovery of heat from blow-off steam and relief gases to give hot water for washing

pulp and for general mill use; to the use of highly efficient evaporator units with additional effects for higher concentration; to recovery furnace units with water-cooled walls giving efficient reduction of smelt and generation of steam at high pressure from the concentrated liquors; to continuous causticizing systems and lime recovery; and to reduction of odors, by condensing the blow-off steam and relief from the digesters, and collection of vapors from other sources for elimination in the boiler furnaces.

He likewise pointed out that practical application and experience at present seem to restrict steam generation at 450 pounds and 750 degrees, with the power generated in double extraction and condensing turbines, bleeding at 140 pounds in the first stage and 40 pounds in the second. With such a power plant and reasonable heat recovery in the combined self-contained pulp and paper mill, commented Mr. Moon, it is reasonable to expect a steam consumption of from 20,000 pounds per ton for lightweight wrapping grades to 15,000 pounds for board, with a corresponding power consumption of from 950 to 550 kw. hr. per ton of finished product.

Among the other pertinent comments made by Mr. Moon in his paper were the following:

Modern recovery units can readily produce 10,000 pounds of steam per ton from the concentrated liquors, and 2,500 pounds per ton can be obtained from bark and sawdust.

Aside from the application of steam accumulators, the peak steam demand of digestors can be reduced somewhat through the scheduling of cooks, by retarding the initial flow of steam to the digesters, and also by cooking in the first stages with low pressure steam.

The splitting of pressures in the steaming operation is best adapted to use with indirect cooking as it is somewhat difficult to introduce 30-pound steam for a direct cook, due to limiting pipe sizes and nozzles in ordinary digesters.

Heaters are best arranged with sufficient capacity to bring the digester up to temperature in the desired time, on the basis of a heat transfer of 5 B. t. u. per degree temperature difference per square foot of heating surface per minute.

Circulating capacity should be sufficient to give at least 8 or 10 complete transfers of the liquid through the heater with a velocity through the tubes of over 7 feet per second.

Approximately 3,300,000 B. t. u per ton of pulp are required to bring the digester and its contents up to temperature. Approximately 2,700,000 B. t. u. of this are liberated in the blow-off steam and can be recovered and used in furnishing hot water for the washing of diffusers and other mill use, giving approximately 3,000 gallons of water per ton of pulp at from 135 to 155 degrees.

The use of full automatic controls in manufacturing and operation is becoming more and more into general favor.

The success of modernization is a joint responsibility resting in the ability of the technical man to convey to the practical operator the principles involved, and last but not least, in the ability of the technical man to learn and obtain ideas from the operator.

Other Papers Before Alkaline Pulping Group

The program of the Alkaline Pulping meeting included two other papers. One of them was entitled *A New Method of Waste Heat Recovery from Intermittent Sources Such as Gases and Vapors in the Chemical Industry.* This paper, the subject of C. Rosenblad, was presented by C. H. Hermaline.

The second paper, entitled *Heat Balance Calculation on Sulphate Recovery System*, was the subject of W. T. Webster, Superintendent, St. Regis Kraft Company.

Waste Heat Recovery Method

The paper by Mr. Rosenblad cited several sources of intermittent waste heat in the chemical industry, such as the heat released when blowing down a sulphite digester, which, according to Mr. Rosenblad, may amount to upwards of 700,000 calories per minute. Mr. Rosenblad also suggested a system for classifying various sources of heat according to their value from the point of view of recovery and described the design of an effective spiral heat exchanger for use with a heat-recovery storage system. The application of the system to pulp manufacture, according to Mr. Rosenblad, has resulted in a saving of heating surface and in certain technical operating advantages. Reference also was made by Mr. Rosenblad to the use of the system for recovering heat and possibly valuable components from flue gases.

Sulphate Recovery System Heat Balance

The paper by Mr. Webster covered the calculation of a heat balance, based on one ton of pulp, for a spray type furnace with waste heat boiler superheater, air preheater, and water walls. The black liquor from one ton of pulp was found to contain 2,750 lb. of solids. Analysis of the black liquor showed a calorific value for the solids of 6,560 B. t. u. per lb. of solids. Black liquor solids contained 63.9 per cent organic material and 36.10 per cent inorganic material. Black liquor as introduced into the furnace contained 35 per cent water and was at a temperature of 212 deg. Fahr. The over-all efficiency of the example as calculated was 70.79 per cent.

Convention Closes

With the completion of the two afternoon sessions on the fourth day of the convention, the curtains were drawn on the twenty-second annual meeting of the Technical Association of the Pulp and Paper Industry—from every angle a most successful meeting.

◆ Supply Dealers Dinner

All previous records of attendance were eclipsed at the twenty-ninth annual banquet of the New York Association of Dealers in Paper Mill Supplies, Inc., in the East Ballroom of the Hotel Commodore, New York, on the evening of February 24. Arranged, as always, during Paper Week in New York, a sizable percentage of the guests at the affair were paper mill purchasing agents and other executives, who were in New York to attend the American Paper and Pulp Association convention.

A sumptuous seven-course dinner was served, following which an elaborate stage show was put on, the stage being well elevated at one side of the spacious dining hall and providing an unobstructed view from every point in the room. An array of talented artists, including vocalists, dancers, funsters and instrumentalists, kept the crowd in merry fettle until past midnight.

Walter H. Martens, of George W. Millar & Co., Inc., New York, and former president of the Association, was chairman of the Banquet Committee, assisted by Joseph P. Gaccione, Julius Levine, Harris Goldman, Louis Gottlieb, Arthur Rosenfeld and Frank Valva.

A handsome journal was published as a souvenir of the banquet, and contained advertisements of numerous supply firms and humorous quips about many individuals in the trade, some of the mill representatives included.

◆ Wood Pulp Importers Association

All officers of the Association of American Wood Pulp Importers were re-elected for the ensuing year at the annual meeting and luncheon of that organization, held in the Carpenter Suite of the Waldorf-Astoria Hotel, New York, on February 11. Edward E. Barrett, of the Mead Sales Company, Inc., New York, was continued as president for the second term; Carlton B. Overton, of Castle & Overton, Inc., was again named vice president; J. A. Millar, of the Perkins-Goodwin Company, was re-elected treasurer, and Seymour Hollister, of the Mead Sales Company, Inc., was continued as secretary.

These officers, together with Nils R. Johaneson, of Johaneson, Wales & Sparre, Inc., compose the Association's Board of Directors for the current year. It was voted to continue also the personnel of the standing committees for another year.

◆ National Paperboard Adopts Resolutions

Resolutions were read and adopted at a meeting of the National Paperboard Association in Chicago, on the sad loss of John L. Barchard, president of Hummel & Downing Company, Milwaukee, Wis. Members at the meeting stood at attention in silent tribute to the memory of Mr. Barchard, while the Resolutions were read by Hugh Strange of Menasha, Wis.

Divisional Bodies Hold Sessions

◆ **The Writing Paper Manufacturers Association** held its seventy-sixth annual meeting during Paper Week in New York, and the yearly gathering of this pioneer trade group was largely attended. An air of enthusiasm, reflecting the highly encouraging market conditions prevailing, pervaded the fine paper producers' sessions. Russell S. Madden, of the American Writing Paper Company, Inc., Holyoke, Mass., was elected president for the ensuing year, being elevated from the vice presidency and succeeding Irving N. Esleeck, of the Esleeck Manufacturing Company, Turners Falls, Mass., as the Association's chief executive. A. C. Gilbert, of the Gilbert Paper Company, Menasha, Wis., and G. P. Lee, of the Eastern Manufacturing Company, New York City, were elected vice presidents; Emmet Hay Naylor, long secretary of the organization, was renamed executive secretary, and Morris C. Dobrow was again elected treasurer. In addition to the president and vice presidents, the Executive Committee chosen for 1937 comprises H. R. Baldwin, Hammermill Paper Company; H. F. Harrison, West Virginia Pulp and Paper Company; H. H. Hanson, W. C. Hamilton & Sons; F. H. Savage, International Paper Company; H. A. Legge, Howard Paper Company; J. D. Zink, Strathmore Paper Company; L. E. Maglathin, Keith Paper Company, and W. C. Wing, Jr., Fox River Paper Company.

Tissue Paper Manufacturers

Succeeding Z. W. Ranck, of the Crystal Tissue Company, Middletown, O., who had served two yearly terms, C. Alfred Wagner, of the Stevens & Thompson Paper Company, North Hoosick, N. Y., was elected president of the Association of Manufacturers and Converters of Tissue at the annual meeting of that divisional group. J. M. Conway, of the Hoberg Paper & Fibre Company, Green Bay, Wis., was elected vice president, succeeding R. E. Rhodes, of the Scott Paper Company, Chester, Pa., and Ben F. Picola, of the Gotham Tissue Corporation, New York City, was re-elected treasurer.

Mr. Wagner also was elected chairman of the Interfold Tissue Association, which is affiliated with the parent group of tissue manufacturers, and Milan Boex, of the Northern Paper Mills, was elected vice chairman. These two officers together with Dwight G. W. Hillister, A. P. W. Paper Company; Robert Black, Morgan Paper Company Division of the U. S. Envelope Company; H. G. Wintgens, Hoberg Paper Mills, Inc., and Wayne Brown, National Paper Products Company, comprise the Executive Committee.

E. Yulke, of the Southern Kraft Corporation, was re-elected chairman of the Roll Toilet Tissue Group, also allied with the Association of Manufacturers and Converters of Tissue; H. Wintgens, of the Hoberg Paper Mills, Inc., was chosen co-chairman, and Harold A. Edlund, was named executive secretary. The Executive Committee of this group consists of the chairmen and Grafton Houston, Fort Howard Paper Company; Wayne Brown, National Paper Products Company; B. Reider, Victoria Paper Mills; E. E. Reed, Reed Tissue Corporation; L. Rossiter, Peerless Paper Mills; S. Lopin, Mazer Paper Mills; C. A. Wagner, Stevens & Thompson Paper Company, and A. Ginsburg, M. A. King Company.

Kraft Paper Association

The annual meeting of the Kraft Paper Association was attended by a large percentage of the manufacturing industry, who listened to reports covering the past year's operations and who formulated plans for the activities of the new year. William H. Anders, of the Nashua River Paper Company, East Pepperell, Mass., was elected president to succeed L. C. Anderson, of the Sorg Paper Company, Middletown, O., and N. S. Stone of the Mosinee Paper Mills Company, was elected vice president. These officers, with retiring president Anderson, J. A. Auchter, Nekoosa-Edwards Paper Company; C. R. McMillen, St. Regis Paper Company; R. A. McDonald, National Paper Products Company; J. L. Stille, Southern Kraft Corporation, and E. A. Kindler were elected to compose the Executive Committee together with the committee members elected a year before for a two-year term; namely, J. R. Miller, West Virginia Pulp & Paper Company; M. E. Cody, Bogalusa Paper Company; C. W. Smith, Central Paper Company, and H. S. Daniels, Union Bag & Paper Corporation. Mr. Anderson was presented a fine silver humidor as a token of appreciation for his services rendered as head of the Association for the past two years. The presentation was made by I. Zellerbach, who voiced the sincere gratitude of the members for the example of constructive leadership and self-sacrificing devotion to his task which had endeared Mr. Anderson to his fellow manufacturers.

Sulphite Paper Manufacturers

With Rufus L. Sisson, Jr., of the Racquette River Paper Company, Potsdam, N. Y., presiding as chairman, the annual meeting of the Sulphite Paper Manufacturers Association was largely attended. Toward the end of the session, H. O. Nichols, of the Crown Willamette Paper Company, San Francisco, Cal., was elected Chairman for the ensuing year. George Stuhr, Southern Kraft Corporation, was re-elected vice chairman of the Unbleached Group; Rufus I. Worrell, Mead Sales Company, vice chairman of the Bleached Group; Mr. Sisson, vice chairman of the Manila Group, and Edgar W. Kiefer, Port Huron Sulphite & Paper Company, vice chairman of the M. G. Sulphite Group. In addition to the foregoing officers, the following were elected to the Board of Governors: John E. Alexander, Nekoosa-Edwards Paper Company; John Stevens, Jr., Marathon Paper Mills Company; L. F. Porter, Northwest Paper Company; Aubrey Crabtree, Fraser Industries, Ltd., and Walter B. Merlin, Hollingsworth & Whitney Company. Thomas J. Burke, New York, was again named secretary and treasurer. I. Zellerbach, of the Crown-Zellerbach Corporation, addressed the meeting, and drew a comparison between conditions now existing in the wrapping paper business with those which existed five or six years ago, and the changes that have taken place in the meantime. He urged the value of co-operative work and advised members not to get careless now that the industry was getting back onto its feet. He pointed out the responsibilities which executives have, not only to their employes but to their stockholders also, emphasizing that the latter have had a good many lean years. In conclusion, he stated that he believed the industry has been well served by its associations, particularly as regards the calibre of the men who have given up a great deal of their time as presidents and chairmen of the different groups, and ended by saying how happy he felt to meet again so many old friends in the Sulphite Paper Manufacturers Association.

Bristol Board Manufacturers

Rufus I. Worrell, of the Mead Sales Company and Wheelwright Papers, Inc., New York, was chosen chairman of the Bristol Board Manufacturers Group at the annual meeting of that organization, succeeding Rolf G. Westad, of the Waterfalls Paper Mills. Mr. Worrell had served for the previous year as vice chairman, and James B. Ramage, of the Franklin Paper Company, was selected to assume that office for the ensuing year. The Executive Committee is headed by President Worrell, the other members being Mr. Westad, Mr. Ramage, Norman Harrower, of Linton Brothers & Co., and Joseph E. Holmes, of the Chemical Paper Manufacturing Company. James Ritchie, New York City, was renamed secretary. The group engaged in an extended discussion relative to freight rates, among other subjects considered.

Cardboard Manufacturers

Kendall Wyman, of the Champion Paper & Fibre Company, Hamilton, O., was re-elected president of the Cardboard Manufacturers Association at the annual session of that group. Also, John B. VanHorn, of the Holyoke Card and Paper Company, Springfield, Mass., was re-elected as vice president, and James L. Ritchie, of New York City, was again named secretary. Messrs. Wyman and VanHorn, together with J. A. Moses, Falulah Paper Company; Donald V. Lowe, Lowe Paper Company; F. C. Heinritz, Appleton Coated Paper Com-

pany, and Herman R. Harrigan, District of Columbia Paper Mfg. Company, will compose the Executive Committee for 1937. In the new official set-up, Mr. Lowe will serve as chairman of the Coated Box Board Group, Mr. Moses of the Blanks Group, Mr. Heinritz of the Coated Tag Group, and Mr. Harrigan of the Photo Mount Group.

Sulphate Pulp and Board

At the annual meeting of the American Sulphate Pulp and Board Association, S. M. Phelan, of the West Virginia Pulp & Paper Company, for the previous year vice president, was elected president, succeeding H. W. Ellerson, of the Albemarle-Chesapeake Company, Inc., West Point, Va., and Walter J. Meyer, of the Brown Paper Mill Company, Inc., West Monroe, La., was made vice president, succeeding Mr. Phelan. These two officers and R. H. Bursch, H. W. Ellerson, D. C. Everest, P. P. Schnorbach, J. D. Zellerbach, A. C. Goodyear and H. L. Wollenberg were chosen to compose the Executive Committee. The meeting reviewed the activities of the past year and formulated plans for 1937.

Book Paper Manufacturers

Members of the Book Paper Manufacturers Association held several meetings during Convention Week. The Executive Committee convened in two sessions on the second day of the convention, while the Grading Committee of the Association held a meeting, as did the Manufacturing Committee. The general session of the Association occurred on the third day of the convention, and was followed by a luncheon in the Jansen Suite of the Waldorf-Astoria. Since the annual meeting and election of the Association has been moved forward to April from February, there was no election of officers by the group.

Paper Sack Manufacturers

While it did not have an annual meeting scheduled, the Paper Shipping Sack Manufacturers Association held three sessions during the convention. Meetings were held in both the forenoon and afternoon on Wednesday of Paper Week, and in between the members gathered at a luncheon. The annual session will take place in September. W. J. Dixon, of the St. Regis Paper Company, New York City, heads the Association, with P. T. Sowden, of Arkell & Smiths, Inc., Canajoharie, N. Y., vice president, and Frank Pocta, of New York City, secretary.

Paper Makers Ad Club

All officers of the Paper Makers Advertising Club were re-elected for the ensuing year at the annual meeting and luncheon of that organization in the Le Perroquet Room of the Waldorf-Astoria on the opening day of the convention. Orin R. Summerville, of the Beckett Paper Company, Hamilton, O., was again chosen president; Edson S. Dunbar, Crocker-McElwain Company, vice president; Charles H. Cooley, American Writing Paper Company, Inc., secretary, and Maurice A. Park, The Marvellum Company, treasurer. Numerous topics were broached for discussion, with Brad Stephens, editor of Direct Advertising Quarterly, outlining the editorial policies to be pursued during the coming year, and F. L. Triggs, advertising manager of the Riegel Paper Corporation, reporting on the mailing list. Mr. Dunbar was appointed to produce a portfolio telling the story of the Club with a view to attracting additional members. The membership quota is 25, and there are now 21 mills active in the Club.

Newsprint Manufacturers

Officers were re-elected for another year at the annual meeting of the Association of Newsprint Manufacturers of the United States. A. L. Hobson, of the St. Croix Paper Company, Woodland, Me., was re-elected chairman, and C. K. Blandin, of the Blandin Paper Company, and J. D. Zellerbach, of the Crown-Zellerbach Corporation, were re-elected vice chairmen. E. L. Crooker, of the International Paper Company, was elected to the Advisory Committee in place of Joseph L. Fearing, of the same company, and Samuel Pruyn, Finch, Pruyn & Co.; Harold S. Smith, Maine Seaboard Paper Company, and R. H. M. Robinson, Minnesota and Ontario Paper Company, were re-elected members of the Committee.

Blotting Paper Manufacturers

At the annual session of the Blotting Paper Manufacturers Association, W. W. Langtree, of the District of Columbia Paper Company, was elected chairman, and Henry S. Mead, of the Wrenn Paper Company, was elected vice chairman. The meeting effected a reorganization of the group following several months of inactivity.

United States Pulp Producers Association

The United States Pulp Producers Association held a well attended annual meeting at which an atmosphere of satisfaction over prevailing market conditions and confidence regarding the outlook was in pronounced evidence. Figures for 1936 cited by Secretary Oliver M. Porter showed a large increase in domestic production of wood pulp last year, and a larger gain in pulp consumption by United States mills. Amor Hollingsworth, president of the Penobscot Chemical Fibre Company, Great Works, Me., was elected president of the Association for the ensuing year, succeeding Stuart B. Copeland, of the Northwest Paper Company, while Mr. Copeland was elected vice president, and Mr. Porter was again named secretary. The Executive Committee for 1937 consists of President Hollingsworth, Vice President Copeland, Norman W. Wilson, Hammermill Paper Company, Erie, Pa.; R. E. Wolf, Weyerhaeuser Timber Company, Longview, Wash.; Ossian Anderson, Puget Sound Pulp & Timber Company, Bellington, Wash.; Russell LaRoux, Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis.; J. R. S. McLernon, Rainer Pulp & Paper Company, Shelton, Wash.; A. H. Showalter, Mt. Tom Sulphite Pulp Company, Mt. Tom, Mass.; J. M. Conway, Hoberg Paper & Fibre Company, Green Bay, Wis., and Downing P. Brown, Brown Company, Portland, Me.

Groundwood Paper Manufacturers

At the annual meeting of the Groundwood Paper Manufacturers Association, C. H. Sage, of the Kimberly-Clark Corporation, Neenah, Wis., was re-elected president for the ensuing year; Samuel Pruyn, of Finch, Pruyn & Co., was again chosen Eastern vice president; J. H. Coy, of the Flambeau Paper Company, was re-elected Western vice president; R. E. Canfield, was renamed executive vice president, and Dr. E. O. Merchant secretary and treasurer. The three first foregoing officers and Aubrey Crabtree, Fraser Companies, Ltd.; E. G. Murray, St. Regis Paper Company; Walter Shorter, International Paper Company; George H. Fay, Escanaba Paper Company; H. O. Nichols, Crown Willamette Paper Company, and L. L. Alsted, Combined Locks Paper Company, were elected to compose the Association's Board of Governors for 1937.

Glassine and Greaseproof

The Glassine and Greaseproof Manufacturers Association at its annual meeting re-elected Folke Becker, of the Rhinelander Paper Company, Rhinelander, Wis., as chairman. The other members of the Executive Committee, also re-elected, were: O. Hedstrom, Hartford City Paper Company; P. E. Hodgdon, Deerfield Glassine Company; R. F. Nelson, Glassine Paper Company, and J. L. Riegel, Riegel Paper Corporation. Thomas J. Burke, New York, was again named secretary-treasurer.

Cover Paper Manufacturers

The Cover Paper Manufacturers Association re-elected Guy H. Beckett, of the Beckett Paper Company, Hamilton, O., to the presidency for another year. F. E. May, of the Rising Paper Company, Housatonic, Mass., was elected vice president, succeeding J. B. Shepherd, of the Peninsula Paper Company, Ypsilanti, Mich., and E. H. Naylor, New York, was retained as executive secretary, and M. C. Dobrow, New York, as treasurer. President Beckett, Vice President May, A. E. Frampton, Hammermill Paper Company; D. T. Quirk, Peninsular Paper Company, and W. J. Warner, The Marvellum Company, compose the Executive Committee.

Soda Pulp Manufacturers

Eustis Paine, president of the New York and Pennsylvania Company, was re-elected chairman of the Soda Pulp Manufacturers Association at the annual meeting of that organization, while Amor Hollingsworth, Penobscot Chemical Fibre Company, was again chosen vice chairman, and Rufus I. Worrell, Mead Sales Company, Inc., was re-elected secretary and treasurer.

Progress is Theme of Salesmen's Association

SUCH rapid progress was achieved during 1936 in recruiting new members for the Salesmen's Association of the Paper Industry that the annual meeting of that organization, held in the Le Perroquet X Suite of the Waldorf-Astoria Hotel, New York, on February 23, developed into something of a jollification gathering. It was brought out that no fewer than 60 new members were added during the year, bringing the total membership of the Association up to 260, the largest in its history, and in attestation of the appreciation of this marked growth, verbal bouquets were handed out rather promiscuously to many of the organization officers who had a part in this excellent showing.

R. C. Johnson, Chicago sales representative for the Northwest Paper Company, and president of the Salesmen's Association, presided at the annual session. Various matters were discussed at the meeting, including the possibility of a Pacific Coast Division for the Association, trade customs revisions, and plans for 1937 Association activities.

In his annual address, President Johnson paid tribute to the new membership committee for the praiseworthy job performed during the previous year in raising the Association membership a full 30 per cent to total 260 members. He also extended a vote of thanks to George K. Gibson for revising the membership list, and to Dr. E. O. Merchant, secretary of the Association, for his highly interesting and instructive weekly bulletins throughout the year. Mr. Johnson reviewed the 1936 activities of the Association, both in the East and West, and commented on prevailing marketing conditions in the paper industry, urging paper salesmen to be constantly on their guard under existing circumstances in upholding the true ethics of their profession.

Edson R. Lyman, of the Missisquoi Corporation, New York City, was elected to the presidency of the Salesmen's Association; Hugh N. Phillips, of the International Paper Company, New York, was elected as eastern vice president to succeed Mr. Lyman, and John T. Burruss, Chicago representative of the Albemarle Paper Manufacturing Company, was re-elected western vice president. Dr. Merchant was again named secretary and treasurer.

James H. Coy paid tribute to the work of retiring president Johnson, mentioning especially the time and effort the latter had devoted to revising the trade customs to result in better uniformity, and also his great success in increasing the organization's membership.

Vice President Lyman reported on the Eastern Division's activities for the year, giving the highlights of the group's weekly luncheon meetings, golf outings and other events, while the Chicago vice president, Mr. Burruss, reported the western division had held five golf tournaments last summer, that all of the meetings through the year were largely attended, and that 27 new members had been added through the western group.

A formal vote of thanks was tendered the annual luncheon committee, headed by William L. Raymond, and votes of appreciation were also given to Vice Presidents Lyman and Burruss for their work on behalf of the Association during the past year, as well as to Dr. Merchant for his valued weekly bulletins.

On motion, the chairman was instructed to draft a telegram to George K. Gibson, a past president and honored member of the Association, who was unable to be present at the annual meeting while in Florida with Mrs. Gibson, who is quite ill, expressing the regrets of the membership of Mr. Gibson's absence.

Approximately 700 attended the annual luncheon of the Salesmen's Association in the Grand Ballroom of the Waldorf-Astoria Hotel immediately following the annual meeting. The luncheon was the social highlight of the day at the A.P.P.A convention.

The speaker program at the luncheon began with an address by Frank J. Sensenbrenner, president of the American Paper and Pulp Association, who warned the assembled salesmen that care must be taken, now that indications show a rising market, that the art of selling does not deteriorate. The combined efforts of all salesmen, he said, are needed to see that real selling art is maintained and advanced. Mr. Sensenbrenner said:

President Sensenbrenner Speaks

"I am particularly glad to extend to you a word of welcome on behalf of the American Paper and Pulp Association, because it gives me an opportunity to compliment the Salesmen's Association upon its assistance in codifying the industry's trade customs and practices. I have followed the work of your committee and I have confidence that it will be a valuable contribution to our group activities.

"My experience in the industry, which now stretches over a period of five decades, has made me generally familiar not only with manufacturing but selling problems. I fully appreciate the necessity for trade customs. Our products are so great in number and the requirements of use demand so many different sizes, weights, colors, packing, finishing, etc., that orderly marketing would be almost impossible if we were not able to standardize our practices. The formulation of recommendations based upon customs that have been thoroughly tested in practice is an important function of our association work. Who is in a better position than the salesman to determine not only the effectiveness of our practices but also the inconsistencies and contradictions that are bound to creep in.

"This work is an example of co-ordinated effort that brings together the forces of the industry to concentrate upon a common problem. It is to be commended.

"The surprising volume of sale in 1936, which actually established a new all high record, is convincing evidence that the depression is behind us. I believe that we can look forward to a period of continued large volume. It may be that the 1937 record will not greatly exceed that of 1936, but even so the industry as a whole is in a relatively advantageous volume position.

"The prospects also indicate a closer relation between supply and demand, with demand actually outrunning supply in the case of some of our products, which enhances the possibilities of advancing prices. In fact in many grades prices have already increased. The industry as a whole seems to be rapidly approaching a point at which it can rebuild its resources that were so severely depleted during the six years of the depression. We appear to have a rising market before us.

"It is a surprising fact that most men in the industry have had little selling experience in a rising market. From 1920 until only recently the curve of paper prices has been downward. In the change from a downward to an upward trend we may need different technique, perhaps a different psychology.

"An expanding market in which sales may be made more easily, also has new problems. Group activities designed to disclose possible solutions are just as important today as they were in the depression. It is particularly important for the salesman to keep informed not only as to market conditions, but also as to industry development. Knowledge of product goes hand in hand with confidence in the quality of the product and in the position of one's company as the prerequisites of selling.

"Manufacturing volume is the first prerequisite to profitable operation in the paper industry. The margins between unit costs and prices are generally so narrow that the influence of idleness is especially great. Idleness can result either from shrinkage in consumption or from too great production capacity.

"The industry is today expanding rapidly. New mills and speeding up of existing machines are adding substantially to capacity. Consumption is also increasing but whether or not it will increase enough to absorb the new capacity as it comes into production is

questionable. Sales promotion that will encourage greater paper use is essential.

"Sales promotion is surely a function of the salesman. He has opportunities to seek out new uses and to make more secure and permanent existing uses. The combined efforts of all salesmen will be required if the industry is to escape an accumulation of idle capacity as production facilities increase.

"Too frequently in rising markets, the art of selling is permitted to deteriorate. The salesman may become simply an order taker. Of this I wish to warn you. We can see clearly what is necessary to make permanent a reasonable prosperity in the industry. We cannot afford to rest on our oars in the light of this knowledge, even though the production of our mills may be completely sold out."

D. C. Everest, chairman of the Coordinating and Trade Customs Committee of the American Paper and Pulp Association, also addressed the salesmen's luncheon, as follows:

D. C. Everest Addresses Meeting

"As Chairman of the Trade Customs Committee of the American Paper and Pulp Association, I take great pleasure in reporting to you at this time upon the activities of the Trade Customs Committee of the Salesmen's Association.

"This statement may appear to be ambiguous, but I assure you that it is not. The Trade Customs Committee of your Association, working in co-operation with the staff of the American Paper and Pulp Association, has made notable progress this year in the consolidation and co-ordination of the trade customs of the industry.

"This is an achievement that, I think, will stand out among the records of co-operative activities during the past year. For years, in fact, ever since I have been connected with the paper industry, sporadic attempts have been made to bring about a codification of trade customs. I have attended many meetings at which this subject has been discussed.

"The result of all these meetings, except one, has been an agreement among everybody present that something should be done, but nothing ever was done. The one exception is the meeting of the Trade Customs Committee that was held yesterday morning. At this meeting a consolidated statement was presented covering the standards and differentials of eleven Divisional Associations. The present study—and it is a study—is confined chiefly to rearrangement and the consolidation in one statement of the more important customs of several Divisions. No attempt has been made as yet to reconcile the differences in standards and in differentials. This must await further study.

"The principal reasons for the rearrangement are two-fold: first, to put into the most useable form for the industry the particular customs of these eleven Divisions, and, second, to provide a comparison of statement and of figures with the hope that, if attention is called to them, the differences and inconsistencies may eventually be eliminated.

"I am glad to say that the Trade Customs Committee will recommend to the Executive Committee of the American Paper and Pulp Association two further steps:

"The first will be to limit the immediate distribution of the consolidated statement of trade customs to the industry, first, to obtain the approval for subsequent wider distribution and, second, to obtain comments and suggestions as to improvement.

"The second recommendation will be to continue the activities of the Committee, and especially to attempt in the forthcoming year a revision of certain of the Divisional Association's trade customs in order that the highest degree of uniformity may be secured.

"If the Executive Committee approves these recommendations, we shall be in a position to carry this work forward. I do not doubt that the Executive Committee will approve them. I know also, that the Executive Committee of the American Paper and Pulp Association will, by appropriate resolution, recognize the assistance of the Trade Customs Committee of the Salesmen's Association.

"I want to emphasize again the important contribution that this Committee has made."

The assembled salesmen were treated to an amusing as well as instructive skit on selling by Professor Richard C. Borden, former professor of marketing at New York University, and Professor Alvin C. Busse, professor of public speaking at the same university. After studying thousands of cases of salesmanship that succeeded and failed, the two professors wrote a book, published by Harper & Brothers. At the luncheon they dramatized the volume's contents and additional data on how, and how not, to make a sale. Their presentation was received with vociferous applause.

The committee in charge of the annual luncheon consisted of William L. Raymond, former Association president as chairman; W. W. Langtry, A. B. Helffrich, J. A. Leyden, H. E. Moley, H. N. Phillips and E. R. Lyman.

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◆ Glycerine Solves Boiler Scale Problem

The problem of boiler-scale formation at one time or another confronts practically every industrial plant. Clearing it out means time and trouble. To prevent or retard the formation, and thus eliminate this item of overhead, glycerine has been found useful.

The power of glycerine as an almost universal solvent is largely the explanation of its efficiency in this usage. The boiler-scale formation is caused primarily by the presence of the lime salts in the water in the boiler. The addition of glycerine acts to increase the solubility of the lime salts, forming soluble compounds.

The lime concentrations in the course of time will become too large to be assimilated in this way by the formation of soluble compounds, but as this happens, a viscous, gelatine-like substance is precipitated which has the advantage of not adhering to the surface of the iron plates. Moreover, it is not carried into the cylinders of the engine by the action of the steam.

No complicated apparatus is involved in this use of glycerine to prevent scale formation, nor is it necessary to work out any complicated formula. Figuring proportionately to the amount of coal used in firing the boiler, practical experience has shown that satisfactory results are obtained simply by adding five pounds of glycerine to the water for each ton of coal.

In this connection the report of the recent series of authentic tests of the effect of scale in cutting efficiency is of interest. In 120 tests, 11 per cent greater output was obtained from steam engines during a single month after the boilers were freed from scale than was obtained during the three months period before they were cleaned. When boilers are operating at heavy loads, especially, scale formation is often directly responsible for the overheating and burning out of the boiler tubes. *(From Glycerine Facts.)*

◆ Mill Superintendent's Convention Plans

Announcement of the names of the men, who will plan and stage all the events for the Eighteenth Annual National Convention of the American Pulp and Paper Mill Superintendents Association, was made by W. Gordon Booth at the Connecticut Valley Division meeting in Springfield, Mass.

The Convention will be held in Springfield at the Eastern States Exposition Grounds on June 23, 24 and 25, 1937. Those on the general committee include: W. Gordon Booth, general chairman; C. H. Kent, executive secretary; and on the advisory committee, John L. Bagg, C. M. Bryan, Charles Champion, E. Victor Donaldson, Henry J. Guild, C. H. Kent, J. B. Ramage, E. C. Tucker, and L. M. Yoerg.

The Exhibits' Committee is sending diagrams of exhibit booths to all tentative exhibitors, with instructions that applications for space first received will get priority consideration.

◆ Appointed Chairman of A.S.M.E. Committee

The American Society of Mechanical Engineers has appointed R. B. Renner, mechanical engineer for the Jeffrey Manufacturing Company, Columbus, Ohio, as chairman of the executive committee of the materials handling division. The function of this division of the Society is to spot, coordinate and bring before the engineering public outstanding developments in conveying machinery and its use.

Mr. Renner has been with the Jeffrey Manufacturing Company for the past 30 years.

◆ Honor Paid Dr. Wriston

Tribute was paid Dr. Henry Merritt Wriston, recent president of Lawrence College and founder and director of the Institute of Paper Chemistry, Appleton, Wis., by Ernst Mahler, vice president of the Kimberly-Clark Corporation and president of the Institute board, at a civic dinner given as a farewell to the retiring president. Four hundred business and professional men and members of the college faculty and students attended.

Mr. Mahler told of the establishment of the Institute in 1929, when just before the financial crash, Dr. Wriston came to him with the idea of forming a graduate school to meet the problem of properly trained chemists for the paper industry. He welcomed the idea, he said, and assisted in attracting the support of other manufacturers. At first classes were started in a corner of the college gymnasium with only a few students. Mr. Mahler offered this picture in contrast to the Institute of today, with two beautiful stone buildings equipped with the finest laboratory and mechanical equipment obtainable, the finest reference library in existence in pulp and paper manufacture, a center of outstanding research, and a world center of guidance in the paper industry.

Regret was expressed by Mr. Mahler in losing the guiding genius of Dr. Wriston, but he predicted for him a rise in the educational world to some of the highest positions it affords. Dr. Wriston has already accepted the presidency of Brown University, Providence, R. I.

The new president of Lawrence College and director of the Institute of Paper Chemistry is Thomas N. Barrows, a graduate of the University of California and son of David Prescott Barrows, a former president of that university. From 1924 to 1931, Mr. Barrows took graduate work at Columbia University and served as teacher of the Lincoln School, Teachers' College at Columbia. He entered Lawrence College as dean in 1934.

◆ J. L. Barchard

John L. Barchard, 55, president of Hummel & Downing Company, Milwaukee, died January 29, at Madison, Wis., where he had been attending the hearings of the "Little Wagner act." He was stricken at a dinner conference in the governor's mansion.

Mr. Barchard began his career with his father, in the wooden box business, at his native home, Toronto, Canada. He came to this country in 1903, locating in Chicago, where he engaged in the lumber business. Mr. Barchard became an executive of Container Corporation of America in Chicago, and when he went to Milwaukee, it was as head of the Hummel & Downing Company, where he remained until his passing. He is survived by his widow, daughter, two brothers and two sisters, and his father.

◆ Nekoosa-Edwards Personnel Changes

Changes taking place in the past few weeks in the personnel of the Nekoosa-Edwards Paper Company included the resignation of Leonard E. Smith, mill manager, who was with the company for 25 years; the addition of Leo Gardiner and Hans Hartvig to the fine paper sales division; and the transfer of C. A. Polansky from the Port Edwards general offices to the Minneapolis sales office, where he will assist Norman Frisby in charge of that office.

Charles Reese, formerly with the Hammermill Paper Company, Erie, Pa., succeeded Mr. Smith, who is now enjoying a vacation, but reveals no future plans.

Another addition is that of Dr. T. A. Pascoe, formerly employed by the Northwest Paper Company, Cloquet, Minn., and authority in the fine paper field, who is now chief chemist for the Nekoosa-Edwards Paper Company. A graduate from the University of Minnesota, in the department of agricultural bio-chemistry, Dr. Pascoe spent five summers as field assistant to the United States Department of Agriculture. He was also assistant professor of biochemistry in the medical school of the University of Minnesota from 1928 to 1930.

◆ Sixteenth Exposition of Chemical Industries

Three floors of Grand Central Palace have been reserved for the sixteenth Exposition of Chemical Industries to be held in New York City, December 6-11, 1937, and advance leasing to date indicates that this Exposition will be one of the largest in recent years.

The role of chemical industries in the great reconstruction period now under way will be emphasized in the coming Exposition and dynamic displays will be constructed to show the coordination of each phase of chemical manufacture with the many industries to which it is related.

Another feature will be a prize competition for a slogan typifying the part of chemical industries in modern life. Details will be announced at an early date by the International Exposition Company directing the Exposition. Charles F. Roth, in charge of previous Expositions, will again be personally in charge of this one.

◆ NEPCO Quits Ruled Paper

Discontinuance of the ruled paper division of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., was announced by John E. Alexander, president, when the Western Tablet and Stationery Manufacturing Company of Ohio bought the ruling equipment of Nekoosa-Edwards and moved it to St. Joseph, Mo. The sale was made to acquire more space for the manufacture of water-marked grades of paper at Port Edwards, which is more advantageous to the company.

◆ Kimberly-Clark Addition

The million dollar improvement program carried out by the Kimberly-Clark Corporation, Appleton, Wis. in 1936 will be increased by $500,000 in 1937, when construction begins on a new two-story, concrete and steel structure, which will house another paper machine, making the Lakeview a four-machine mill at Neenah, Wis.

Mr. Sensenbrenner, president of the corporation, stated that the new addition was deemed necessary in the face of the increased demand for specialties and other products.

◆ Curt Weil with Warren Steam Pump Co.

Mr. Curt Weil, who has been with the Chesapeake Corporation, West Point, Va., has just made a connection with Warren Steam Pump Company, Warren, Mass.

While with the Chesapeake Corporation, Mr. Weil was assistant to the general superintendent of the company's pulp and paper mills in the development of new processes and the installation of new machines. He goes to Warren as assistant to the chief engineer in the development of new pulp and paper mill pumps.

◆ Producer of Sulphur To Be on West Coast

A new sulphur producer, called Sulphur Diggers, Inc., is now in the market with Sidney B. Wood, Jr. as president, and W. N. Wilkinson as general manager. The main office is in Los Angeles and a branch office in New York City.

Source of supply for the new company is in Inyo County, Calif., where there are large sulphur deposits of a high grade. West Coast mills are expected to be particularly interested because of location, which will enable them to receive faster service and due to proximity, an enviable price.

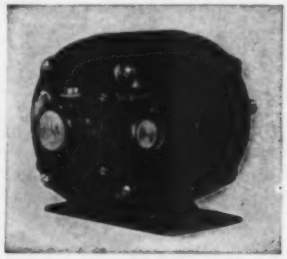
◆ AWP Reaches Final Re-organization

February 15 saw the final hearing in the Massachusetts federal district court on the re-organization of the American Writing Paper Company, Inc., after two years of proceedings under the federal bankruptcy law, 77 b. At this hearing, Judge Hugh D. McClellan approved the plan to sell two mills: Norman division at Holyoke to Frank Gross of Boston for $3500, and Unionville, Conn., division to Connecticut Power Company for $5025.

The new board of directors includes the following: Thomas Harper Blodgett, chairman; Sidney L. Willson, president of the old company; D. Samuel Gottesman of New York; Elbert A. Harvey of Boston; Frank S. Shaw of New York; George E. Warren of New York; and Oliver Wolcott of Boston. Only Willson and Shaw were on the old board.

◆ Thermal Overload Switch for Fractional HP. Motors

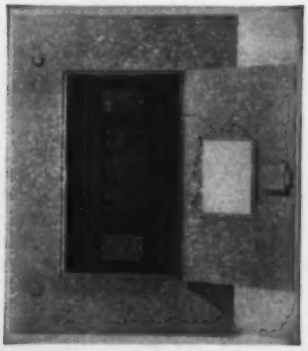
A new thermal overload switch for fractional horsepower motors, operating on line current and arranged for convenient mounting on the conduit or terminal box of the motor, has been placed on the market by the General Electric Company, Schenectady, N. Y. This device, completely self-contained and known as the "thermo-tector," automatically disconnects the motor from the line, when an overload occurs, before the motor reaches a dangerous temperature. Then, when the motor has cooled, it automatically is reconnected to the line, the entire operation being repeated at a safe interval until the motor is freed of overload or is removed from the line.



Where the automatic-reset feature is not required, a form of the new switch is available which can be used to disconnect the motor from the line and leave it disconnected until the device is reset manually.

◆ Multibreaker Equipped Panelboard

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has developed a new panelboard in which multibreaker units are used. This board, known as a Nofuze panelboard, is designed for 115, 115/230 volt a. c. service in a range of 4 to 40 circuits in 2 circuit steps. Bus arrangements for single phase, 3/2 wire, and 3 phase 4 wire services are provided. Branch circuit ratings of 15, 20, 25, 35 and 50 amperes are available. The multibreaker units employed permit of a compact design in which box dimensions are held to 15 inches wide by 4 inches deep.

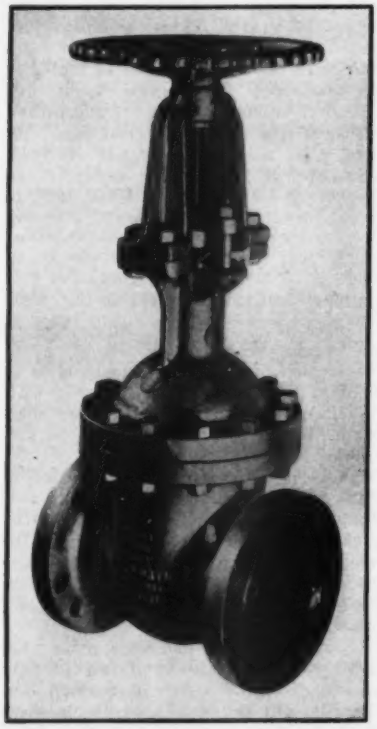


◆ Paper Scale Improvement

E. J. Cady & Company, 549 West Washington St., Chicago, Ill., have announced a recent improvement in the design of the pendulum indicator on their paper scale. The improvement consists of a hairline indicator that is divided into two lengthwise sections. This design permits the eye to train one section directly upon the other and allows the operator, sitting directly before the scale, to read exactly the indication or graduation.

◆ Steel Gate Valves

Heavy wall thicknesses, deep stuffing boxes, oversize stems, streamline flow and steel handwheels with fluted rims are some of the engineering features included in the new Walworth steel gate valves. These valves, available for 150 pound and 300 pound steam pressures, are made of carbon molybdenum steel (identification symbol C-1) to A. S .T. M. specifications A 157-36. The accompanying illustration is from an unretouched photograph of one of the 300 pound valves.



◆ Five-Year-Old Transmission Belt Remodeled

In their zeal to obtain efficiency, companies frequently consign to the junk pile old equipment which, with a few minor changes, might be adapted readily to other operations within their plant. However, the Franklin Board and Paper Company of Franklin, Ohio, overlooked no such opportunities when they had occasion recently to make alterations in their motive power equipment.

This company, in September, 1931, installed a 101-ft., 40-inch, 10-ply Goodrich Highflex belt on a Corliss engine drive. In the spring of 1936, after the belt had seen almost five years' continuous service, it was deemed advisable to abandon the drive.

Considering length of service and the

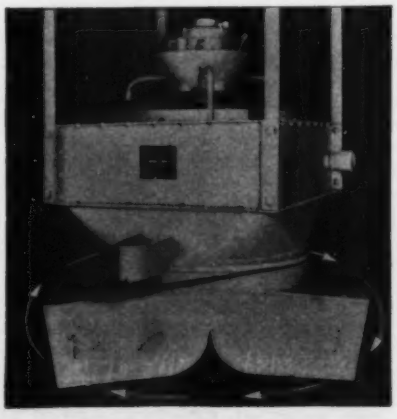
fact that they had no other drive requiring a belt of this size, it would have been an easy matter for the management to justify its disposal from a cost angle. Examination, however, showed it to be in excellent condition and capable of many more months' operation.

The belt was returned to the Goodrich plant where it was cut to 60 ft. length and 32-inch width, stripped down from 10 to 9 ply and then made endless by the Plylock splice. Upon completion of this work, the remodeled belt was installed on a 250 h.p. drive, as illustrated. It has now been in operation almost a year and the user is highly pleased with the operation.

Conversion of belt over to this new drive resulted in little or no loss of material. The remaining 40 feet of belt, as well as the strip left from the original cutting down operation, were cut into six and eight-inch widths and stripped to four-ply for various transmission purposes about the plant.

◆ Revolving Discharge Unit Heater

L. J. Wing Mfg. Co., Seventh Ave. and 14th Street, New York, N. Y., has announced the development of a unit heater with a revolving discharge. This



type of discharge constantly and successively changes the direction of air flow from the heater through 360 degrees. The revolving discharge portion of the heater may be had separately for attachment to other Wing heaters already installed.

◆ Stock Distributing Vat of Stainless Steel

Made entirely of stainless steel, the stock distributing vat shown in the accompanying illustration, is expected to last many times as long as a vat made

of ordinary metals. This vat, fabricated from stainless steel manufactured by the American Rolling Mill Company of Middletown, Ohio, and equipped with a special series of valves, is in use by the Gardner-Richardson Company, also of Middletown.

◆ Rubberizing Compound Requires No Primer

A rubber compound which incorporates the quality of a primer with a self-curing, cold-curing, rubber for application to metal or other surfaces by dipping, spraying or by hand brushing has been developed by the Self-Vulcanizing Rubber Company, 605 W. Washington Blvd., Chicago, Ill. This product is claimed to make a steadfast bond in one application—a vulcanizing period of one hour being allowed for it and for each succeeding coat that is applied to bring the coating up to desired thickness—and to give a very smooth, enamel-like finish. It is suggested for use as an insulator and waterproofer, and for resisting corrosion caused by alkalies, salt solutions, mild acids, and chemical fumes.

◆ Laboratory Heater

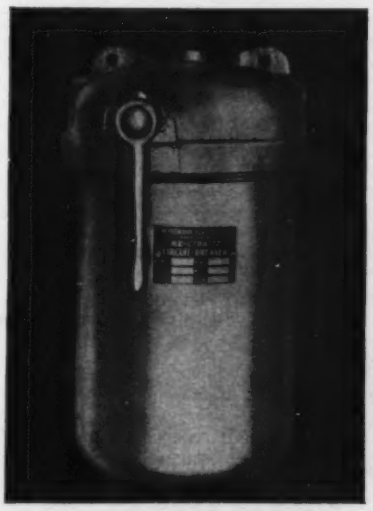
The Precision Scientific Company, 1735-54 N. Springfield Ave., Chicago, Ill., has announced a new laboratory heater as a supplement to its present line of laboratory heaters and hot plates. This new heater, designated as Ful-Kontrol and measuring only 9½ inches high and 4¾ inches square, permits wide range of heat control—from 0 to 750 watts in increments of less than one volt through the use of a built-in auto transformer. Any one of seven different and interchangeable tops can be specified for the heater at no extra cost.

◆ Fractional Horsepower Motorized Speed Reducers

Foote Bros. Gear & Machine Corporation, 5301 South Western Blvd., Chicago, Ill., has added a line of fractional horsepower motorized speed reducers to its standard line of power transmission equipment. These reducers, known as IXL Fractional Horsepower POWERED GEARS, range in size from 1/50 hp. to ¾ hp. and in ratios from 2 to 1 up to 8,000 to 1. The various types include single and double reduction worm gear, single reduction helical gear, and combination worm gear and planetary gears at the higher ratios.

◆ Circuit Breaker for Hazardous Locations

The Heineman Co., Trenton, N. J., has announced the development of a special two-part cast metal housing for use with its Re-Cirk-It breaker when installed in locations where inflammable gases and explosive dusts prevail. The circuit breaker is mounted on the upper section of the housing and is actuated by an approved bushed handle which closes and opens the circuit independently of the tripping action of the enclosed breaker under normal conditions. Tapped hubs for 1" threaded conduit are



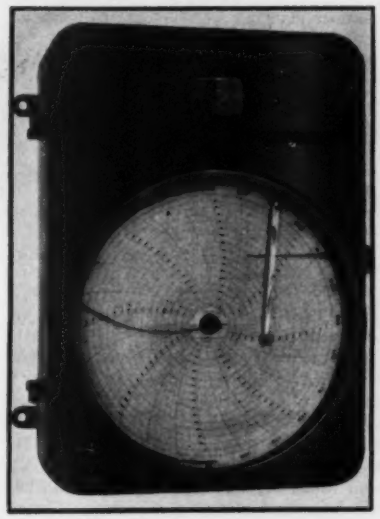
provided at the top of the casing. The bottom section slips around the breaker, screws into the upper casting, thus sealing the mechanism.

Breakers to be mounted in this special casing are available in any capacity from 50 milliamperes up to 35 amperes, and in 1, 2, and 3 poles. There also is a choice of instantaneous trip and time-delay types.

◆ New Round-Chart Potentiometer

A new recording potentiometer of the round-chart type has been developed by The Bristol Co., Waterbury, Conn. This potentiometer, known as the Pyromaster, requires no lubrication; is not affected by normal plant vibration; and can be used where the air is laden with dust, moisture, and corrosive fumes.

The operating mechanism is made up of fine small compact units which are



replaceable. There are no mechanical connections between the galvanometer unit and the other units. The pen is actuated in such a way as to follow changes in the measured quantity as they occur and at a rate dependent upon the rate of change.

The instrument is available as a pyrometer, tachometer, resistance thermometer, millivoltmeter, and milliameter.

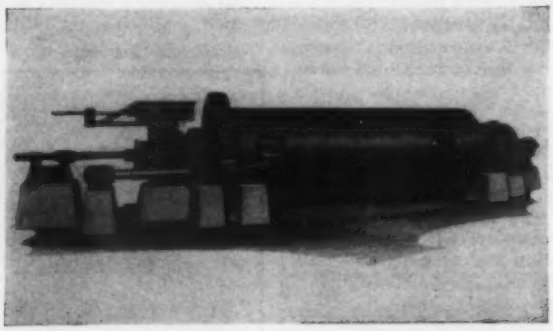
◆ Explosion Proof Lighting Fixture

A new line of 200-watt, enclosing-globe type explosion proof lighting fixtures with attachable porcelain enamel steel reflectors has been announced by the Benjamin Electric Mfg. Co., Des Plaines, Ill. These fixtures, listed by Underwriters' Laboratories for Class I, Group D hazardous locations, embody a number of exclusive features. Among these features are: detachable hood construction in which socket is held between hood and fixture body by deep-threaded joint to form a barrier between conduit system and lamp chamber; socket with conventional terminal screws accessible through removable inspection plug; inner, auxiliary reflector of etched Alzak aluminum; guard threads to outside of fixture body clamping the enclosing globe in place; and reflectors that clamp onto head on guard and which can be attached or detached without disturbing guard.

◆ Jacketed Continuous Feed and Discharge Tube Mill

The Patterson Foundry & Machine Co., East Liverpool, Ohio, has developed a line of jacketed continuous feed and discharge tube mills for grinding and processing work of all kinds.

Products treated in this mill can be heated during the grinding operation by circulating steam or hot oil through the jacket or they can be cooled by circulating cold water or brine. Thus, materials, which must be heated in order to induce liquefaction or to form vapor from the moisture content or the product, may be handled. Likewise, products with low softening points may be ground by reducing the temperature within the mill below the softening point of the product.



◆ Unit Air Conditioner

The Carbondale Division of Worthington Pump and Machinery Corporation, Harrison, N. J., has announced a new line of sectionalized unit air conditioners. One section of the individual unit contains complete fan assembly with motor, another the complete coil and humidifying assembly, and another the base and cleaning elements. Heavy

steel frames, welded and coated inside and out with waterproof and sweatproof insulation, form the cabinet for each section. Outside surfaces are finished in a rust-resisting enamel.

This unit air conditioner, with all moving parts readily accessible, is available in sizes from 300 to 11,000 cubic feet per minute and in refrigeration capacities from 2 to 50 tons.

◆ Inverted Bucket Trap

Sarco Company, Inc., 183 Madison Ave., New York, has announced the addition of a new inverted bucket trap to its line of steam specialties. This trap, utilizing the same valve mechanism common to Sarco thermostatic traps, can be furnished with integral air bypass carried inside the bucket and consisting of a regular thermostatic trap element of the balanced pressure type. It is stated that this air bypass never requires setting and operates satisfactorily regardless of pressure fluctuations in the trap. The trap, available in sizes from ½" to 2", is equipped with a cast iron body for 125 lb. steam pressure, semi-steel for 250 lb., and cast steel up to 500 lb. Valve heads and seats are of stainless steel.

◆ Essay Contest

Advertising Age, national advertising publication, has announced its second annual prize contest for essays of not more than 1,000 words on "How Advertising Benefits the Consumer." Competition is limited to undergraduates in high schools, colleges and universities, and $1,000 in cash prizes, plus two all-expense trips to New York City, will be awarded.

Essays must be mailed before midnight, May 1, 1937. There is no entry fee.

◆ Seventh Annual Packaging Exposition

Present economic and legislative developments influencing marketing, makes the coming conference on packaging a significant and timely meet. It will be the Seventh Annual Packaging Exposition, taking place at the Hotel Pennsylvania in New York City, March 23 to 26.

An attendance of 10,000 executives from all parts of the country is anticipated, and renowned authorities on package design will address the many conferences and round table meetings. All booth space for the exposition has been leased weeks in advance, promising a 20 per cent increase in exhibit area over last year's record.

One of the many features of the exposition will be the competition for the Sixth Annual Irwin D. Wolf Awards, America's highest honors for merit in packaging.

◆ Minneapolis-Honeywell Acquires National Regulator Line

To facilitate complete service and make available a full line of all types of air-conditioning equipment for the consumer, the Minneapolis-Honeywell Regulator Company, Minneapolis, has entered in an agreement for the acquisition of the complete line of pneumatic controls manufactured by the National Regulator Company of Chicago.

The fact that each project on the market for air conditioning requires its own individual type of equipment—i.e., pneumatic or electric, etc.—makes it necessary for the dealer to carry all types to properly service his client. In striving for this co-ordination, Minneapolis-Honeywell Company feels that the acquiring of this pneumatic line will complete its air conditioning service.

◆ G-E Employees Receive Awards

Thirty-three Charles A. Coffin Foundation awards were received last month by that many employees at the General Electric Company in Schenectady, New York, for outstanding accomplishments of workers during 1936.

Prominent among those honored was Mrs. Sophia Baikusis, a widow with two small children, employed at the Schenectady plant for 12 years. She has offered approximately 89 suggestions for improved manufacturing methods, and 54 of them have been accepted by the company as worth while. Beside the Coffin Foundation award, Mrs. Baikusis has received cash awards for her accepted suggestions.

The foundation was established in 1922 by General Electric as a tribute to the late Charles A. Coffin, founder and first president of the company. Since that time and including the most recent citations, 484 awards have been made.

◆ Ideal Dresser Buys Marshall Electric

The Ideal Commutator Dresser Company, Sycamore, Ill., makers of electrical products, have acquired the Marshall Electric Company of Elkhart, Indiana, which manufactures voltage regulators.

The Marshall company's operations will be transferred immediately to Sycamore and consolidated with the main office of the Ideal Commutator Dresser Company, which will manufacture the full Marshall line, with all patents reserved.

◆ Re-organization of Norwood

Immediate re-organization is assured to take the Norwood Engineering Company, Florence, Mass. out of receivership. A hearing on the petition was held February 15 before the federal court in Boston.

The original 40-year-old company was placed in receivership some time ago in order to conserve the assets. Receivers were Howard W. Hosford and G. Wilson MacDow, the company's chief executives. The re-organization plans call for a new corporation under the name of the Norwood Engineering Company, with Howard W. Hosford as president and G. Wilson MacDow as treasurer.

During the period of receivership a steady gain has been shown in sales volume and it is expected that the re-organization clear all obstacles in the way of continued growth.

◆ THE SUPERHEATER COMPANY announces that the sales, engineering and servicing of "Elesco" superheaters and economizers for stationary plant installations have been transferred to the Combustion Engineering Company, Inc. The manufacture and inspection of this equipment will continue at the East Chicago Works of The Superheater Company.

◆ Forms Canadian Company

The Mine Safety Appliance Company of Pittsburgh, Pa. has taken over the personnel and business of the safety department of Drummond, McCall & Company, Ltd. of Montreal, Quebec, agents for the Mine Safety Appliances Company since 1918, and from it will form a new company to be known as the Mine Safety Appliances Company of Canada, Ltd.

R. Morris, former manager of the Drummond, McCall safety division, will be in charge of the new company, which will also maintain an office and warehouse at New Glasgow, Nova Scotia. A complete stock of MSA safety equipment will be carried at both cities.

◆ THE FOXBORO COMPANY, Foxboro, Mass., has added to its staff Bruce B. Wallace, who will work out of Los Angeles as a sales engineer from the company's offices there.

◆ LEWELLEN MANUFACTURING COMPANY, Columbus, Indiana, announces the appointment of the Tidewater Supply Company, Norfolk, Va., as distributors for Lewellen variable speed transmissions in the states of Virginia, North Carolina and South Carolina.

◆ FOR THE PAST FIVE YEARS vice president and general manager of the Seminole Paper Corporation, Division of the International Paper Company, Harry B. Weil recently resigned this position to form his own organization with headquarters in Chicago. Mr. Weil's organization is a new service provided manufacturers of products distributed through grocery stores to increase the efficiency of distributors at point of sale, by closer contact and clearer interpretation of selling plans.

◆ Dard Hunter Plans Trip to India

Word is received from Dard Hunter that he expects to leave the United States about the middle of September for India, where he will visit all of the remaining handmade paper mills and make photographs and drawings. Dr. T. Venkajee, who is a friend of Mr. Hunter and a paper mill chemist in Madras, will arrange for the journeys to various outlying mills. In Burma, Mr. Hunter expects to visit the few remaining mills in the Shan States.

A short time ago THE PAPER INDUSTRY published a notice stating that the remaining copies of Mr. Hunter's book, *Papermaking Through Eighteen Centuries* would be sold for $4.75. Only 150 copies of this book now remain unsold and Mr. Hunter is very anxious to dispose of the supply before leaving for India. This work is a very elaborate one and will not be reprinted. Therefore, those who desire copies for themselves or their plant libraries should send in their orders without delay. Address Dard Hunter, Chillicothe, Ohio.

◆ E. VICTOR DONALDSON, president of Robert Gair Company, Inc., New York City, announced the acceptance by the shareholders of Canadian Paperboard Company, Ltd. of the offer of Robert Gair Company, Inc. for their properties consisting of paperboard mills at Montreal, Campbellford, Frankford, and Toronto, Canada. Previously, these mills had been leased since 1934 by Robert Gair Company, Inc.

◆ SCENE FOR THE 1937 convention of the American Pulp and Paper Mill Superintendents Association, Pennsylvania, New Jersey and Delaware division, will be the Ritz-Carlton Hotel, Atlantic City, from April 30 to May 1, 1937, it was announced by Harry C. Busser, association chairman.

◆ DECEMBER, 1936, machinery exports from the United States showed a 28 per cent increase over that period for the previous year. Outstanding in this general increase was the gain of paper and pulp mill machinery from $633,264 to $1,345,036, and of paper-converting machinery and parts from $499,323 to $1,108,953.

◆ THE BLAW-KNOX COMPANY, Pittsburgh, Pa., board of directors has elected H. B. Loxterman a vice president and Albert L. Cuff, secretary. Officers elected to subsidiary companies are: W. H. Eisenbeis as vice president of the Union Steel Casting Company, and John Baker as sales manager of the same company; and P. M. Fleming as vice president and a director of the Pittsburgh Rolls Corporation.

◆ Thomas Toovey Joins Penn Salt

The Chlorine Sales Division of the Pennsylvania Salt Manufacturing Company, producers of liquid chlorine, have added the services of Thomas W. Toovey, who will be located at the Philadelphia executive offices.

Mr. Toovey first entered the pulp and paper field in 1923, and is a chemical engineer with a broad knowledge in handling pulp bleaching problems and their relation to the use and application of liquid chlorine. It is in this capacity that he will assist the Pennsylvania Salt Manufacturing Company.

◆ DR. JESSIE E. MINOR announces the association of Roswell B. Cheves as consulting wood technologist, with headquarters at Dr. Minor's laboratory, 55 State Street, Springfield, Mass.

◆ THE BANTAM BALL BEARING Company of South Bend, Indiana, a subsidiary of Torrington Company, Torrington, Conn., has changed its name to the Bantam Bearings Corporation. This was done to more clearly describe its present day production of taper and straight roller bearings.

◆ J. H. THICKENS, vice president of the Masonite Corporation, Laurel, Miss., has just left for Australia on a trip that will keep him away for two or three months.

◆ Use of Bronze-Welding Increases

The Linde Air Products Company, New York City, has prepared an extensive review of the advancement and progress in the use of oxy-acetylene welding and cutting process during 1936.

With reference to the pulp and paper industry, this report states of particular significance in the industry has been the rapidly developing use of bronze-welding for the joining of copper piping. Many benefits have been found by this method of joining including the elimination of paper staining, and greater flexibility in fabrication of special joints and shapes for the piping systems.

◆ WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY will move its East Pittsburgh offices and some of its general offices to the Union National Bank Building in Pittsburgh, where the company will occupy nine floors. This focusing of executive offices is planned to facilitate the operations of each. May 1 is the tentative date for the move.

◆ DUE TO RECENT flood conditions, the Lincoln Electric Company, Cleveland, Ohio, has changed its location of the Cincinnati office. At the new location, American Building, Central Parkway at Walnut Street, F. H. Smith and E. T. Gregory will maintain a complete stock of Lincoln welding accessories and supplies.

◆ Causticity Test

Tests of the treated water should be made from time to time to check the correctness of the treatment. The test for causticity is as follows:

Add one drop of phenolphthalein solution to 50 c.c. of the water to be tested and a pinkish color will appear. Add sulphuric acid, a drop at a time, and shake. When the color disappears, the causticity has been neutralized, and each 0.1 c.c. of acid used denotes 1.7 parts causticity per 100,000.

In properly treated water, the tests should show a relation of alkalinity, hardness and causticity about as 6:5:4. If there is an excess of causticity, too much time has been used; if an excess of alkalinity and low hardness, too much soda ash has been used; reverse results indicate the opposite faults.

◆ SALES OF COCHRANE equipment in the New England territory were consolidated February 1 under the Cochrane Steam Specialty Company, Boston, Mass. O. S. Pike will direct the sale of Cochrane water treatment equipment and T. N. Graser the sale of Cochrane specialties and meters.

◆ Deferred Maintenance Is Costly

Deferred maintenance is the real "bugbear" of power plants and is represented by the cost of putting the plant in the best practical working order at any given time. A new plant may be kept running for several years with comparatively little maintenance, but during that time deferred charges are accumulating that must eventually be met. Repairs and renewals must then be made simultaneously on a large amount of equipment, thus impairing service and sending the cost of maintenance suddenly skyward.

There are few engineers who do not concede the fallacy of deferred-maintenance practice, and yet, strange to relate, there are also few who have had the courage to eliminate the evil.

The extreme limit of maintenance, of course, would be to keep the plant continuously in a new state, but since such a condition could only exist in theory, some practical limit must be established by investigation and experience. Even then, however, maintenance is not to be applied indiscriminately; to become a real economy it should be efficiently standardized.

There are two distinct divisions of such work, the first being a combination of inspection and record keeping, the second consisting of repairs and renewals. There can be little doubt that many costly failures have been directly attributable to improper or insufficient inspection. A specific instance which occurs to the writer was one in which the field circuit of a 150 H. P. direct-current motor was accidentally opened, allowing the motor to run away. In the ensuing wreck a piece of flying debris struck and killed an attendant, while another piece cut through some brass pipe carrying three-phase, high-voltage cables. A severe "short" occurred, starting surges which shut down the plant at an important hour of the day. This disastrous accident could, in all probability, have been avoided by proper inspection, since an investigation disclosed the fact that a field wire had been gradually "chafing" through because of excessive vibration.

Systematized, efficient inspection and records should be the basis of maintenance, and the elaborateness of the work should agree with the size and importance of the plant.

◆ RECIRCULATING DRYERS proved a boon to manufacturing and power companies in recent flooded areas, when they were used effectively in drying out motor parts and other electrical equipment. The Ohio Power Company, Canton, Ohio purchased two such units for that purpose from the American Foundry Equipment Company, Mishawaka, Ind.

◆ DURING THE annual meeting of stockholders and directors of the Lee Paper Company, Vicksburg, Mich., Maxwell D. Bardeen, son of the late Norman Bardeen, was elected president of the company, filling the vacancy left by his father.

◆ Grounding Methods Important

Once in a while a problem of grounding of electrical connections arises due to the fact that no metal-piping system is close at hand. When a metal-piping system is not available, the next best ground is one to permanent water depth. In this connection it should be remembered that certain amounts of energy can be transmitted continuously by grounds without causing a variation in the resistance. After this amount has been transmitted the current dries out the surrounding earth, resulting in a rapid rise in resistance. This is an important consideration in surface grounds. Conductivity of grounds, it has been found by tests, can be increased as much as twenty-five times by frequent salting. With a uniform soil and moisture condition the contact resistance of a pipe ground is proportional to its length in the ground up to about 8 ft. Beyond that depth tests have shown that the contact resistance is not materially lowered by increasing the depth of pipe. Placing the pipe 16 ft. instead of 8 ft. lowers the resistance only about 5 to 10 per cent. The size of the pipe is largely determined by the driving requirements and the longer life of a large pipe, but not from difference in contact resistance. Doubling the size of pipes gives only about 5 to 10 per cent lower resistance, while driving pipes a few inches or a foot apart is equivalent to one pipe of a large size. Pipes driven not less than 6 ft. apart and connected in multiple give a combined resistance proportioned to the number of pipes.

Lightning arrester grounds should never be made to the same artificial grounds as secondary grounds or those of other electrical apparatus. Arrester grounds should therefore be at least 20 ft. from other grounds.

◆ Precautions for Starting Electrical Machinery

It is always advisable to make sure that the insulation of an important machine is in good condition before starting. If the windings have been exposed to moisture during or after shipment or erection, dampness will lower the insulation resistance and may allow sufficient current to flow through the insulation to damage it. This is particularly true of direct-current machines, in which the insulation has many more openings than in ordinary alternating-current machines.

If the usual tests show a value of insulation resistance of ½ megohm for moderate-sized machines, full voltage may safely be applied. If the tests show materially lower values, then drying out is advisable.

A small machine, when conditions permit, can be dried out by building a temporary wooden housing or even a rough tent over it and supplying heat by a steam coil or resistance heater placed in the pit. Ventilation may be afforded by means of openings near the bottom and top of the housing to carry away the moisture as it is driven out of the windings.

Another method is to run the machine at about one-tenth speed and dry it out by current generated in the windings by itself. In the case of an alternating-current generator the stator should be short-circuited through an ammeter and enough field excitation applied to cause full-load current in the stator windings.

If it is a direct-current generator, disconnect the shunt field, short-circuit the machine terminals through an ammeter and apply enough exciting current to the shunt field from some separate source of supply to hold the current generated by the armature down to about full-load value. This shunt current must be opposite in direction to that which flows in the shunt field in regular operation, since its duty during drying out is to buck the excitation produced by the series field.

Very little field excitation is needed and extra rheostats in addition to the field regulator supplied for the machine will be required. The short-circuiting connections should be well made and substantial, as they must carry the full-load current of the machine.

A few hours' run on short-circuit will dry out any ordinary case of moisture. Longer drying wil be needed if machine has been soaked by rain, flood or fire hose. The heat is generated in the copper of the windings and is therefore applied in a most effective manner right at the seat of the trouble.

During drying out, the insulation resistance should be tested occasionally. When it is satisfactory the machine can be properly connected, run up to speed and voltage and put in service.

◆ New Catalogues and Publications

Alemite Division, Stewart-Warner Corporation, Chicago, Ill.—"Alemite Controlled Lubrication," the new 56-page, 1937 industrial catalogue, showing Alemite's entire range of industrial equipment, is now off the press. It is a two-color book, and features several actual photographs of the company's equipment in use by varied types of industries. Free copies are mailed on request from the Stewart-Warner Corporation.

American Manganese Steel Co., Chicago Heights, Ill.—Amaco materials handling pumps, pipe line fittings and rotary dredge cutter heads are covered in a new bulletin just received. The various types of pumps, fittings, etc., are illustrated and described.

Association of Consulting Chemists and Chemical Engineers, Inc., New York City —The directory of members of this Association for 1937 is now available and may be received gratis on request. Not only does it give the regular directory data, but also valuable reference matter on the details about the work of the leading consultants and the particular work for which they are best adapted.

Bailey Meter Company, Cleveland, Ohio —A new 40-page catalogue, "Bailey Fluid Meters for Steam—Liquids—Gases," designated as bulletin 301 has been distributed by this company for those interested in flow meters. It illustrates the manner in which any desired combination of indicating, recording and integrating features may be combined with a flow mechanism suitable for the measurement of steam, liquids or gases under high, low or medium pressures. Problems of installation are also discussed.

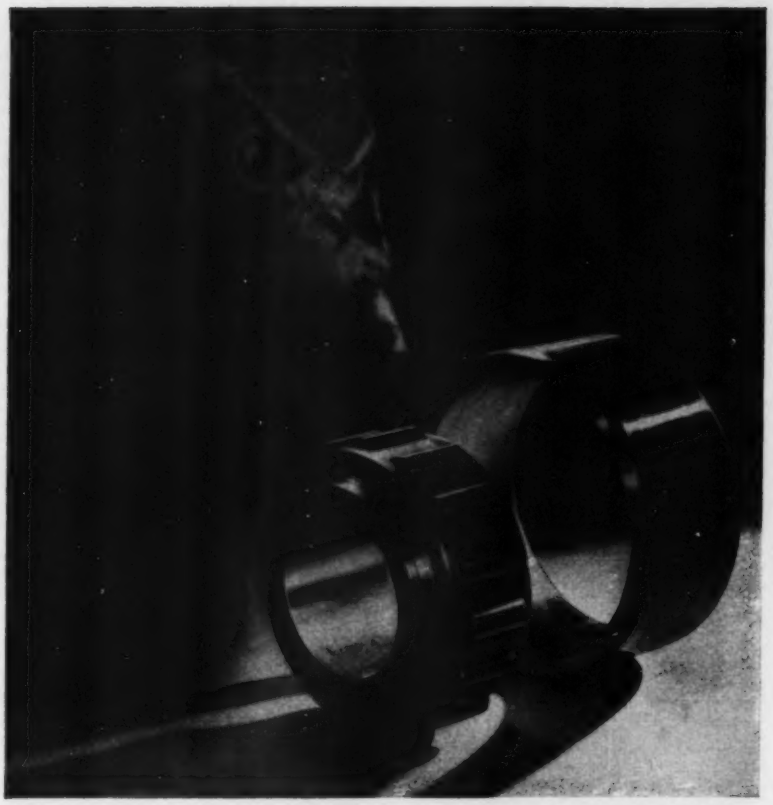
D. M. Bare Paper Company, Roaring Spring, Pa.—The first of a series of broadsides, describing overnight delivery from Roaring Spring, was issued by this company. The double spread of this broadside shows a delivery routing map and the advantageous point the company has for overnight shipments.

W. H. & L. D. Betz, Philadelphia, Pa.—A third and revised edition of "Water Analysis," by these chemical engineers and consultants has been printed. It is a 32-page book containing interesting facts and data on the subject of water, correction methods, chemical analysis, and required apparatus. It is distributed free.

Black-Clawson Company, Hamilton, Ohio—An attractive brochure for this manufacturer has been circulated as form No. 107. It explains the new benefits offered by its super-cylinder paper machine and describes with illustrations the talking points on the company's new type vats.

Bristol Company, Waterbury, Conn.—The new recording round-chart potentiometer, known as the Pyromaster, is described in bulletin No. 482, which contains drilling dimensions, chart lists, and other engineering data pertaining to the pyrometer, tachometer, resistance thermometer, millivoltmeter, and milliammeter. Copies will be sent on request. Bulletin 436 is devoted to Bristol's Electric Recorders. In addition to the descriptive material which is well illustrated and trimmed with color, sample charts with readings are given. There are diagrams and other data.

Brown Instrument Company, Philadelphia, Pa.—This company has just published for release a very attractive catalogue, No. 2004, which describes in simple, non-technical language, the operation of its flow meters and the construction of the orifice plate. Both types, mechanical and electrical, flow meters are discussed in connection with their application to power plants, water works, and gas generation service, as well as to general industrial use.



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CYLINDRICAL ROLLER **ROLLWAY BEARINGS**

Chain Belt Co., Milwaukee, Wis.—Three bulletins have been received from this company. They are devoted to REX Roller Chain, REX Griplock Chain, and REX 2-Metal Chain. List prices are given.

Cochrane Corporation, Philadelphia, Pa. —Two new Cochrane publications are out. The first, No. 2094, describes the Cochrane Mechanical Flow Meter with its means of checking accuracy, etc. The second, No. 2540, is devoted to a discussion of the prevention of corrosion by complete removal of oxygen and dissolved gases from the feed water in modern steam plants with the Cochrane Deaerator.

Coleman Electric Company, Maywood, Ill.—"Measuring pH With the Glass Electrode" is the name of a new booklet published by this company. It was written in conjunction with a successful researcher in this field and covers a general discussion of the theory of the glass electrode and factors that must be considered in its practical application. Acid, alkali, and temperature correction tables are included, together with a very complete bibliography of some 130 references. Copies mailed on request.

Consolidated Guide Corp., Chicago, Ill.—A guide for the convenience of shippers and receivers of goods has been published by this corporation to supplant the many and sundry references heretofore necessary for the calculation of a shipping rate. One thumb-index reference leads the user instantly to the comparative rail, truck, express and parcel post shipping rates from 109 key points throughout the country to thousands of destinations. Air, water and foreign parcel post rates also form important sections to the guide.

DeLaval Steam Turbine Company, Trenton, N. J.—Motor-Mounted pumps are described in a catalogue issued by DeLaval.

This term is used to designate a unit consisting of a centrifugal pump mounted directly upon the frame of an electric motor to form a compact unit. It does not require a special foundation and can be attached to whatever support is most convenient and in any position. The motor may be of the open, splash-proof, totally enclosed, or explosion-proof type, for direct or alternating current.

Fairbanks, Morse & Company, Chicago, Ill.—Bulletin 3600-A1 is described the construction and application of this company's Model 36 diesel power units. This industrial service model is offered in two cylinder sizes and in various combinations, with rating as low as ten horsepower. It is the smallest in the complete line of Fairbanks-Morse Diesels.

Flexrock Company, Philadelphia, Pa.—"Ruggedwear Resurfacer" is the trade name for industrial flooring material made by Flexrock. In a new pamphlet out this month its qualities and uses are explained and cost tables are included for any size job.

Graham Transmissions, Springfield, Vt.—In Bulletin No. 302, seven vital features are listed in which this company claims the Graham variable speed transmission ranks first. The construction is explained and illustrated and the bulletin contains tables of dimensions, speeds and capacities, etc.

B. F. Goodrich Company, Akron, Ohio—A Buyer's Guide to Mechanical Rubber Goods is the title of a new 27-page catalogue just issued by the Diamond Mechanical Div. of this company. There are illustrations and descriptions of over 50 mechanical rubber products and accessories which have a wide industrial use. Also there are tables listing horsepower capacity and minimum pulley diameter for belts of various sizes and plies, general data pertaining to the proper selection and installation of conveyor belting for different types of service and interesting facts about hose construction and application.

Gould Pumps, Seneca Falls, N. Y.—Distribution of an especially attractive new bulletin, describing the "Close-Cupld" centrifugal pump made by this company, has been announced. Complete information on ratings, construction, specifications, dimensions, etc., is given along with listings of the 21 sizes of these pumps, ranging in capacities and heads, from 5 to 1600 G. P. M., up to 525 feet. Ask for bulletin, No. 208.

D. W. Haering & Company, Inc., Chicago, Ill.—"Art of Proportioning," a new 24-page illustrated catalogue of this company, explains the construction, operation, and application of a variety of proportioning feeders along with photographs of installations. The use of pitot tubes, fluid pistons, and proportioning of various chemicals is discussed in detail.

Harbison-Walker Refractories Co., Pittsburgh, Pa.—Two new folders have just been released by this company. "Ladrillos Refractarios," with both Spanish and English texts, is for the use of consumers of refractories in Spanish speaking countries. "Firebrick with a Reputation" is a new folder intended primarily for domestic consumer use.

International Nickel Co., Inc., 67 Wall Street, New York City—This company has prepared a 48-page booklet primarily as a guide book to Monel and other non-ferrous nickel alloys in the fields of engineering applications. There are 20 subdivisions in the booklet, each devoted to specific problems in fields from hydroelectric and steam power plants to highway maintenance. Special items included are those dealing wtih meters and other regulating equipment, sewage disposal, pump maintenance and other items of general interest. The booklet is sent free to members of all branches of the engineering profession.

Kalamazoo Vegetable Parchment Co., Parchment, Mich.—An unusual broadside put out from this company, is a facsimile of a double-spread newspaper page. On the left page, in newspaper style make-up, is a reprint of a prize essay, titled "The Story of Parchment and KVP" by Helen Southon, a student at the University of Michigan. On the page to the right of the fold is a full-page advertisement for Kalamazoo Vegetable Parchment Company, which enumerates the many food products using KVP protection wrapping papers.

Kennedy Valve Mfg. Co., Elmira, N. Y.—An attractive broadside, known as No. 47, describes a new line of fully bronze-bushed standard iron-body wedge gate valves. There are large sectional views of these valves with reference to 33 outstanding features of design. A fracture through the valve metal is illustrated to show the exceptionally dense structure which it is claimed is 50 per cent stronger than ordinary cast-iron. Copies on request.

Lewis-Shepard Company, Watertown, Mass.—A new, colored folder, No. 321, on Materials Handling Equipment, has been issued by Lewis-Shepard. It illustrates lift trucks, lift truck platforms, floor trucks, stackers, portable elevators, drum drain stands, barrel racks, and carboy pourers. Copies are mailed on application.

Lewis-Shepard Co., Watertown, Mass.—A small illustrated folder, No. 506, covers portable cranes, hand and electric pow ered, with either revolving base, telescopic or hinged frame,—for shop, factory, warehouse and general utility to pile or service products or materials o many kinds. All newly designed portabl cranes are shown. Copies on request.

Lincoln Electric Co., Cleveland, Ohio—New bulletins are available on: Lincoln Shield-Arc SAE Welders, A.C. and D.C. models, and Model SA 150 Welder.

Lunkenheimer Company, Cincinnati, Ohio—This company has just released a 16-page illustrated Guide for selecting valves, boiler mountings and lubricating devices. It contains a thumb-index and products are grouped by pressure, type and use. The Guide is a ready reference for buyers and specifiers of these products.

D. J. Murray Manufacturing Co., Wausau, Wis.—The new Smith-Egan continuous beater is the heading and subject matter of an attractive advertising piece circulated by this company. A diagram and copy explaining the new features of the continuous beater make up the content of the folder.

Norton Company, Worcester, Mass.—List prices are included in the new edition of Grinding Wheel Specifications for Grinding Machines, a 112-page directory of shapes circulated by Norton Company. It is a valuable reference manual, giving wheel specifications for the standard sizes and types recognized by the United States Department of Commerce, Simplified Practice Division. It serves the double purpose of reducing the variety of wheels used at present, and also furnishing a guide for the designer of future grinding machines and attachments.

Patterson Foundry & Machine Co., East Liverpool, Ohio—The company's new 1937 Agitator-Mixer Book is just off the press. There are 71 pages and cover. The material is well arranged and amply illustrated; printed on coated stock with varnished cover. Special features include: (1) a double page spread of drawings representing all types of equipment. This is in white on blue; (2) a spread photograph of the Patterson plants. The equipment described includes mixers for every class of service, agitators, and process kettles for all classes of research and process work. The contents are indexed for ready reference.

Patterson Foundry & Machine Company, East Liverpool, Ohio—Patterson Company has distributed a colorful and unusual brochure, stating its case on the electrically heated process kettle and its varied uses. On the back page the company announces the gratis assistance of its research division to manufacturers with chemical or physical production problems.

Reliance Electric & Engineering Co., Cleveland, Ohio—A graphic and instructive folder is made available by this company for those interested in up-to-date methods used in protecting the field coils of direct current motors and generators from damp, dirt, corrosive fumes, etc., and from deterioration under severe operating conditions, by the use of its new bobbin-type field coils with waterproof sealing features.

Standard Conveyor Company, North St. Paul, Minn.—"Key to Greater Profits" is the title for an illustrative folder issued by Standard Conveyor. Pictures and description of the Standard pier conveyors, employing an endless carrying apron supported on an adjustable boom to enable piling materials to heights of 30 feet or more, form the contents of the folder.

United States Rubber, Inc., New York City—In order to insure the most efficient application of industrial packings to the specific purposes for which they were designed, this company, has issued a 112-page manual on the subject. It is one of the most complete ever compiled for use by chemical, mining and petroleum engineers, plant operators and executives in these industries. The twelve specially indexed and cross-indexed departments include sheet packing, gaskets, rod and plunger packings, hydraulic packings, flax and jute, locomotive and special oil well rotary drilling packings, pump valves, and miscellaneous packings and engineering sections.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa.—A new illustrated catalogue describing the new low priced Westinghouse Nofuze circuit protection particularly suitable for homes, small stores, office buildings, and commercial structures requiring not more than 16 circuits, is announced by this company. Nofuze circuit protection uses small automatic circuit breakers instead of conventional fuses. Ask for catalogue No. 29-300.

BOOKS

Big Business: Its Growth and Its Place.—This volume, the first of three volumes embodying the results of a study of big corporations and their place in American life, attempts to show how large big business bulks in comparison with the smaller concerns on the American economic map as a whole, and on the various sectors of the map which represent specific industries and groups of industries. Among the facts revealed by the study are: individuals and partnerships still carry on almost half of the country's total business; American business, viewed from the standpoint of concentration of labor, varies widely—for 82 industries as a whole, the 512 largest concerns, or 1.6 per cent of the total number, employed 37 per cent of all wage earners; giant corporations are very big—the 594 largest corporations, which are three-twentieths of one per cent of the total number of corporations, owned 53 per cent of the total corporate assets in 1933; distribution of net income of the largest corporations shows the same high degree of concentration—69 most prosperous corporations having net incomes of five million dollars and over three-quarters of all corporations that earned profits at all earned less than $5,000 net apiece.

A special research staff under the direction of Rufus S. Tucker made the factual study; while Alfred L. Bernheim prepared the findings of the report for publication. The volume was published by the Twentieth Century Fund, Inc., 330 West 42nd St., New York on a strictly non-profit basis and is priced at $1.35 per copy.

◆ No Fear of Monopoly in Timber Resources

"At the present time there is no justified fear of monopolistic control of the timber resources of the country," says Professor Nelson C. Brown of the New York State College of Forestry at Syracuse University.

"The policy of acquiring large timber reserves to protect the future of capital investments is changing. It is becoming recognized that second-growth timber is renewing itself at a rapid rate. Many forest industries are now planning to purchase all log or raw material requirements in the open market rather than indulge in heavy overhead expenses incident to holding timber properties for a long period of time. Examples of this may be seen in many pulp and paper mills, sawmills and other industries.

"For several years it was felt that there were great trusts or monopolies with dangerous concentrations of timber ownership in relatively few hands. A search for monopoly and timber consolidations did not indicate any concentrations in ownership detrimental to the public interest.

"Within recent years concurrently with decreasing stumpage values the tendency has been to break up the large timber holdings through forced sales or to liquidate investments by cutting the timber at an increasing rate. Interest, taxes and fire hazard burdens of carrying investments on timber have had an important bearing on this situation," says Professor Brown.

"Competitive conditions have been severe in the lumber industries for twenty years or more. The industry has been faced with two great problems, whether to secure a higher price for the product or to reduce costs of logging and manufacture. Both were attempted but it was found that with lumber production scattered among 30,000 mills it was impossible to liquidate timber assets on a satisfactory price basis. When prices became attractive night shifts were added to day work. Additional mills came into production and the surplus lumber was dumped on the market quickly, which reduced prices. The peak of lumber prices was reached in 1920 and in view of these facts monopolistic control of our timber resources would seem out of the question."

◆ Arc Welding Prize Contest

The $200,000 award contest announced last month by the James F. Lincoln Arc Welding Foundation for competition in the mechanical science field, will not close until June 1, 1938, when all manuscripts must be postmarked before or on that date and received in Cleveland not later than July 1, 1938.

To participate in this contest, it is necessary that submitted papers describe either the redesign of an existing machine, structure, building, etc., so that arc welding may be applied to its manufacture; or that they present a design, in whole or part, of a machine, structure, building, etc., not previously made—the description to show how a useful result, which was impractical with other methods of construction or could better be done by arc welding, is obtained.

Competition and prizes are offered in eleven major divisions of industry: Automotive, Aircraft, Railroad, Watercraft, Structural, Furniture and Fixtures, Commercial Welding, Containers, Welderies, Functional Machinery, and Industrial Machinery. Other awards will be distributed to winner in sub-classifications of each industry. The principal prize winner will receive not less than $13,700, with other prizes ranging from $7,500 to $100.

Dr. E. E. Dreese, Chairman of the Jury of Awards, emphasized the fact that the competition may be entered by any person, or group or more persons; the sole limitation being that any contestant may enter only one paper, on only one subject, in only one of the sub-classifications. Other information may be obtained from the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

◆ Report of Import Committee

According to a report by the Import Committee of the American Paper Industry, Imitation parchment imported at Louisville from Belgium and at New York from Germany is claimed to be dutiable at 2 cents per pound and 10 per cent, under the Belgian trade agreement reducing the rate of duty

WHETHER YOU NEED a few sections of pipe for a replacement . . . or several thousand feet for a new supply line . . . you will save time and money by sending your specifications to Armco. Here's a good example of what we mean.

Designing with Armco Spiral Welded Pipe, we were able to fabricate the special elbow shown above *in one piece instead of four*. By this method the customer saved 3 sets of galvanized flanges and 3 sets of bolts and gaskets—a total saving of more than $40 on only 8 feet of pipe.

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You can obtain this sturdy, easy-handling pipe in diameters from 6 to 36 inches, with a variety of wall thicknesses and coatings designed for individual requirements. Address your specifications to The American Rolling Mill Co., Pipe Sales Division, 705 Curtis Street, Middletown, Ohio.

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WANTED—Engineering Draftsman for book paper mill. Excellent opportunity for good man. Please state experience, training, salary and when available. Address Box 256, THE PAPER INDUSTRY.

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For The Papermaker's Library

Pulp Bleaching—a symposium of ten articles; each prepared by an authority. Makes a practical reference and operating guide for chemist and mill operator alike. Nothing else like it in the literature of the industry.

Papermaking Research Around the World, by Dr. Louis E. Wise. Resume of several hundred contributions to the foreign press. Pithy and interestingly written. Covers research activities in Russia, Sweden, Japan, Great Britain, France, Italy and Germany.

Identification and Microscopy of Woods and Wood Fibers Used in the Manufacture of Pulp, by Ellwood S. Harrar and J. Elton Lodewick. A condensed manual on wood identification that not only discusses various softwoods and hardwoods used in the making of woodpulp but also includes several keys to their identification.

Lessons in Paper Making (Part 1 and Part 2), by Harry Williamson. Part 1 discusses such subjects as running a winder, dryer felts, wrinkles and rips, presses, wet felts and their handling, suspension of fiber-slice velocity, head boxes and control, aprons and shake control, variables and the wire. Part 2 takes up the operation of the wire, sewing the wire, building the reel, structural formation of paper, the superstructure of paper, beater room preparation, vacuum-atmospheric pressure, distribution of atmospheric pressure-suction boxes, theory of color and safety practice in machine room. *(Issued as two separate publications.)*

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on vegetable parchment. The paper was classified for duty at 3 cents per pound and 15 per cent, and the importers have protested to the Customs Court against this ruling.

Two importations of paper and three importations of envelopes at Cleveland were held to have been undervalued, and the importers are asking the Customs Court to remit the additional duty imposed in lieu of penalty for such undervaluation, on the claim that the undervaluation was without fraudulent intent.

Five importations of Japanese lightweight paper classified for duty at 6 cents per pound and 20 per cent as tissue paper, claimed by importers to be dutiable at 3 cents per pound and 25 per cent as decorated writing paper.

◆ Heating and Ventilating Exposition

The Fifth International Heating and Ventilating Exposition will be held at Grand Central Palace, in New York City, January 24-28, 1938. Since its inception in 1930, the Heating and Ventilating Exposition has been held every two years. The first showing was in Philadelphia, the second in Cleveland, the third in New York City, and the fourth, which took place in 1936, was held in Chicago. Each successive Exposition has met with an increasingly active response, both on the part of exhibitors and audience. The presentation of the Exposition in leading cities in different parts of the country, coupled with the growing interest in air conditioning, has made it a most significant industrial exposition which has drawn attendance from all over the world.

Significant in connection with the Fifth Exposition scheduled for early in 1938, and for which plans go forward during the entire twelve months preceding, is the trend to new building activity which is a natural part of national recovery. Healthful living and efficient working conditions necessitate new expenditures for modern heating and ventilating equipment. In every section of the United States, it is becoming recognized that the atmospheric conditions in the home, office, and factory are properly a subject for year-round attention.

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"Lightnin" propeller type mixers are reducing mixing time and improving the results of such operations as dissolving dye-stuffs, preparation of tub sizing, wax emulsions, coating mixes, to mention only a few. Smaller standard models are especially well suited for laboratory mixing and experimental processes. In practically every case a more uniform product, savings in materials, time and power consumption result.

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July 1, 1936 to June 30, 1937
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Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A			
GROUP B	Southern Kraft Corp.	Continental Div.	York Haven, Pa.
GROUP C	Kimberly-Clark Corp.	Lakeview Mill	Neenah, Wis.
GROUP D	Southern Extract Co.	Knoxville	Tennessee
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	United States Gypsum Co.	Gypsum	Ohio
	Hollingsworth & Whitney Co.	Aroostook & Cobbossee	Gardiner, Me.
	The Mead Corp.	Nashville	Tennessee
	Rogers Fibre Co., Inc.	Bar Mills	Maine
	Central Fibre Products Co.	Vincennes	Indiana
	International Paper Co.	Riley Mill	Riley, Me.
	Central Fibre Products Co.	Mt. Carmel	Illinois
	Hollingsworth & Whitney Co.	Abenaquis	Madison, Me.
	Division II		
	Union Bag & Paper Corp.	Specialty	Hudson Falls, N. Y.
	Container Corp. of America	Chicago	Illinois
	Container Corp. of America	Anderson	Indiana
	Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

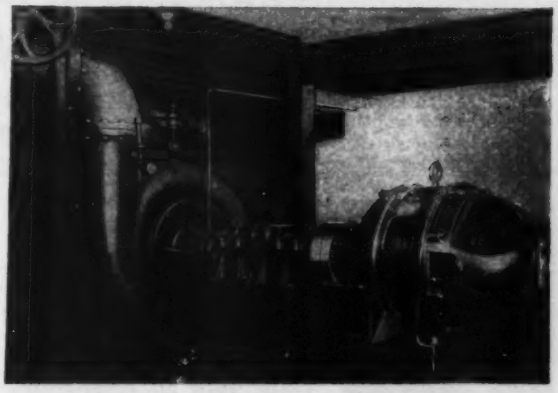
	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P- 10	1	2	2.053
	P-108	2	5	3.042
	P- 28	3	9	3.244
	P- 27	4	6	3.491
	P-121	5	4	4.008
	P- 25	6	3	4.228
	P- 13	7	7	6.443
	P- 30	8	8	6.867
	P- 19	9	7	7.741
	P- 23	10	7	8.133
	P- 9	11	15	8.536
	P- 58	12	7	8.764
	P- 64	13	9	9.070
	P- 21	14	7	9.578
	P- 87	15	11	9.693
	P- 18	16	14	10.111
	P- 12	17	9	10.133
	P- 44	18	12	10.610
	P- 62	19	14	11.256
	P- 2	20	10	11.773
	P- 84	21	15	12.491
	P- 60	22	13	12.622
	P- 67	23	23	13.931
	P- 1	24	27	15.222
	P-101	25	18	19.356
	P- 73	26	31	21.450
	P- 95	27	19	22.986
	P-102	28	27	23.262
	P-127	29	21	25.209
	P- 40	30	28	35.836
	P-126	31	74	35.983
	P- 45	32	30	42.579
	P- 71	33	39	45.482
	P- 32	34	40	50.060
GROUP B	P- 60	2	1	1.747
	P- 72	3	1	1.921
	P- 15	4	1	1.946
	P- 51	5	1	2.116
	P- 68	6	3	4.770
	P-100	7	2	5.831
	P- 26	8	4	6.169
	P- 22	9	5	7.187
	P- 3	10	4	7.445
	P- 50	11	4	8.621
	P-112	12	5	8.752
	P- 11	13	7	10.629
	P- 70	14	8	12.610
	P- 4	15	6	12.727
	P-107	16	11	17.579
	P-104	17	12	24.823
	P-120	18	15	27.499
	P-122	19	18	31.337
	P-128	20	20	33.370
	P- 16	21	19	33.845
	P- 82	22	22	36.066
	P-124	23	10	36.308
	P- 46	24	28	52.277
	P-123	25	32	59.681

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP C	P- 55	2	1	2.516
	P- 56	3	1	3.177
	P- 88	4	2	5.382
	P- 89	5	2	6.036
	P- 52	6	2	6.228
	P- 37	7	4	10.709
	P- 14	8	3	11.724
	P- 61	9	4	11.982
	P-103	10	3	13.320
	P- 49	11	3	13.490
	P- 43	12	5	18.287
	P- 41	13	6	18.979
	P- 94	14	5	21.279
	P-116	15	4	21.915
	P- 34	16	8	27.930
	P- 29	17	11	29.822
	P- 39	18	15	36.996
	P- 80	19	10	40.188
	P- 17	20	11	40.287
	P-111	21	11	46.689
	P- 33	22	17	53.281
	P- 47	23	17	60.322
	P-113	24	22	61.817
	P- 48	25	30	78.017
GROUP D	P- 36	11	1	6.421
	P- 98	12	1	6.483
	P-117	13	1	6.883
	P- 90	14	1	7.220
	P- 93	15	1	8.383
	P- 5	16	4	20.105
	P- 86	17	2	21.158
	P- 85	18	1	22.316
	P- 6	19	5	25.282
	P- 99	20	3	27.791
	P- 53	21	4	28.451
	P- 91	22	6	29.698
	P- 81	23	5	31.782
	P- 42	24	4	32.568
	P-106	25	6	35.620
	P-118	26	5	42.234
	P- 90	27	10	48.165
	P- 65	28	5	49.742
	P-125	29	5	51.060
	P-129	30	25	147.145
	Division II			
	R- 6	5	3	3.900
	R- 2	6	2	3.909
	R-19	7	1	4.155
	R-15	8	1	10.747
	R-13	9	2	12.118
	R- 3	10	2	13.299
	R- 1	11	4	13.591
	R-21	12	7	14.823
	R- 5	13	10	17.494
	R-18	14	4	18.633
	R-11	15	3	18.834
	R-14	16	3	50.967

No January Report—Six. mo. total only: International Paper Co., Riley, Me.; Union Bag & Paper Corp., Specialty Mill; Bemis Bros. Bag Co., East Pepperell, Mass.; P-64; P-120; P-103; P-116; P-111; P-47; P-117; P-118; P-65; P-129; R-19; R-21.
Report delayed—Five mo. total only: United States Gypsum Co.; P-100.

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



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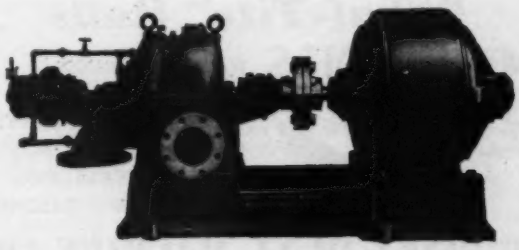
Have you checked the efficiency of your present pumping equipment with the results obtainable from present day Morris designs? If not, you may be surprised at the comparison and what it will mean in your power costs. Engineers who have investigated this matter have found that in many cases a new Morris Pump pays for itself in less than two years through savings in power alone—and then continues to pay a handsome dividend on the investment. It won't cost you anything nor place you under any obligation to make a similar check for your plant. You will find the report of the Morris Engineers to be both thorough and dependable; and if the investment in a new pump would not be justified, the report will say so, frankly.



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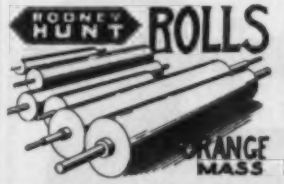

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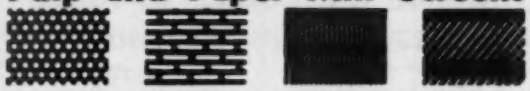

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POWER

GENERATION + UTILIZATION + MAINTENANCE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

By W. S. JOULE

◆ Effect of High Combustion Efficiency on Superheat

In a number of plants where oil, powdered coal or more modern stoker equipment has superseded less efficient fuel burning equipment, the superheat has been lowered in some cases more than 50 per cent, necessitating large increases in surface or the removal of the superheater to a higher temperature location. In many cases, it has been found practically impossible to obtain the desired steam temperature with the superheater located above the tube bank.

This loss in superheat with increased combustion efficiency is a result of the reduction in excess air and consequent increase in heat absorption in the first pass of the boiler and of the lessening of secondary combustion incident to better gas mixtures in the furnace. It is not generally realized that the combustion of one per cent of CO above the tube bank may increase the superheat 50 to 60 degrees.

◆ Ascertaining Correct Brush Position

Because correct brush position is of great importance in the operation of interpole machines, this is usually marked on the rocker ring by the manufacturer before shipment. On some older machines the brush position is not marked or is marked wrong, and it is usually advisable to determine it correctly. This is also important after armature rewinding. The "kick" method is thought best as it depends upon the transformer action between the field and armature conductors. To set the brush position by the "kick" method the armature cables and equalizer are disconnected and insulated. After the resistance in the field rheostat is "cut in" in series with the field the brushes are set at what is thought to be the correct position on the commutator bars, which are connected to the inter-poles. A low-reading voltmeter (3-volt or 5-volt scale) is connected to one positive and one negative brush stud, and the main switch is closed and quickly opened again. If the voltmeter needle "kicks" one way when the switch is closed and the other way when it is opened, the brush position is wrong. The brushes should be adjusted until the position is found where the needle does not "kick."

◆ Furnace Temperature Important

Furnace gases must be maintained at a temperature at or above their ignition point until combustion is complete. Theoretically, the most efficient combustion is that resulting in the maximum temperature possible. In practice, there are frequently factors which, from the standpoint of commercial operating efficiency, make it advisable to keep furnace temperatures somewhat below those which could be obtained were this the sole factor involved.

An additional requirement which has to do with the physical rather than the chemical aspect of combustion is that proper provision must be made for the expansion of the gases during the period of their combustion.

Mixing, agitation, or eddying of the gases will hasten combustion, but an excess of air will still be necessary to complete combustion in a reasonable time. The more thoroughly the air is distributed and mixed with the combustible gases, the less excess air will be required. The gases must furthermore be maintained at a temperature above the ignition point until oxidation is complete.

In order to insure thorough mixing of the gases, it is sometimes necessary to provide suitable baffling, or deflecting arches. In other cases, steam jets are introduced in the furnace, usually just above the fire doors.

◆ INCANDESCENT electric lamps are rated for a given light output at a certain voltage. On a lower voltage a lamp will give less light and on a higher voltage more light. This is generally understood, but few appreciate that the variation in light output is several times as great as the variation in voltage. A difference between rated voltage and operating voltage of a few per cent is accompanied by a percentage difference in light output about three and a half times as great.

◆ THE WEARING course of a concrete floor should preferably be mixed in the proportions of one sack (1 cu. ft.) of Portland cement to 2 cu. ft. of fine aggregate, the minimum thickness of this course to be ¾ in. The mortar should be of the driest consistency possible to work with a sawing motion of the strike-board. This wearing course should be placed immediately after mixing and it should be placed on the fresh concrete base before the latter has hardened appreciably.

◆ Heat Losses Accompany Draft Variation

It is not practical to attempt to save all the heat units in fuel. There are, however, certain avoidable losses and one of the largest is found in improper draft control. Excess air to the boiler furnace means high stack losses and low boiler absorption, while a deficiency of air means losses due to unburned gases. Best efficiency is reached with the smallest amount of excess air possible without producing unburned gases. Draft regulation may contribute rather than prevent the avoidable losses.

Fluctuations of air supply in excess of the load fluctuations result either in an excess or a deficiency of air. A regulator which fluctuates air supply in excess of the load requirements only momentarily touches the point of best efficiency as the air supply is fluctuated from one extreme to the other. The loss in efficiency due to operating over a wide pressure range consistent with load fluctuations would in the most of cases be small provided the mean average load was at maximum efficiency rating. But the loss due to a continuous fluctuation of air supply in excess of load requirements, or an air supply which is not consistent with the thickness of fuel bed is the chief source of avoidable waste.

◆ Feed Water Temperature

Superficially, it would seem that to obtain the highest possible steam generating efficiency, the boiler feed water should be at a temperature as high as possible. Every heat unit added to the feed water before it enters the boiler relieves the boiler of just that much extra work and permits of a higher actual evaporation per pound of fuel burned. Heat for the feed water heater is derived from exhaust steam and where the exhaust would otherwise be going to waste, it is certainly desirable to utilize as much of it in this manner as possible. Where, however, condensing equipment is available and exhaust steam might otherwise be used to produce power, the question as to how much should be bled off for heating feed water is by no means a simple one.

In any plant having any arrangement of main and auxiliary units, condensers, economizers, etc., there is a particular feed water temperature that will give best efficiency and this temperature need not necessarily be high. The question must be considered as to its thermal aspect.

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TECHNICAL DEVELOPMENTS

The following abstracts are of the latest developments found in the foreign press.

IN THE PAPER INDUSTRY

◆ German Kaolins

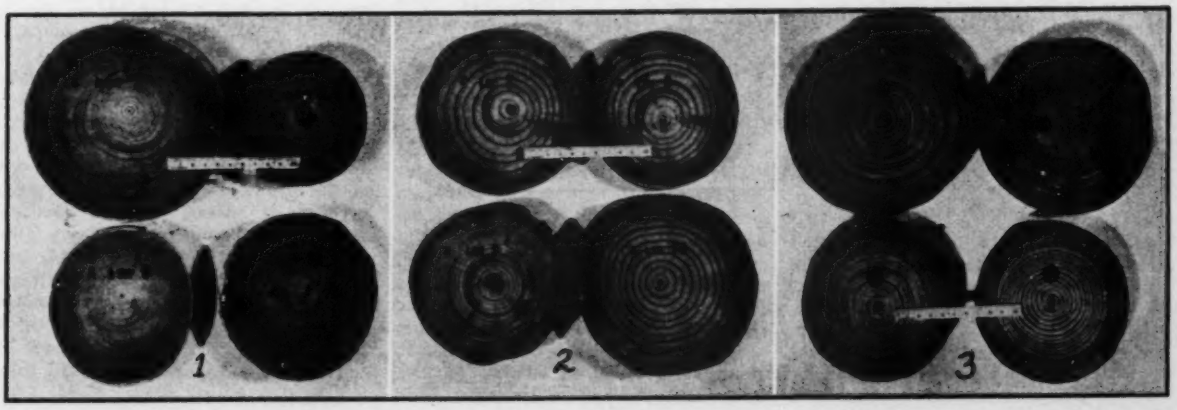
A systematic study extending over a period of a year was made, with a view towards replacing foreign kaolins by the corresponding German products. Researches were carried out on 33 samples (obtained from various raw materials, which showed only slight variations in specific gravity, but whose residues on a 4,900 mesh screen and on a 10,000 mesh screen respectively were very different). The homogeneity or non-homogeneity and the size of the kaolin particles were investigated carefully. The degree of whiteness and the plasticity were measured and the sample was then classified according to its serviceability in papermaking, abrasiveness and smoothness being important factors in the classification.

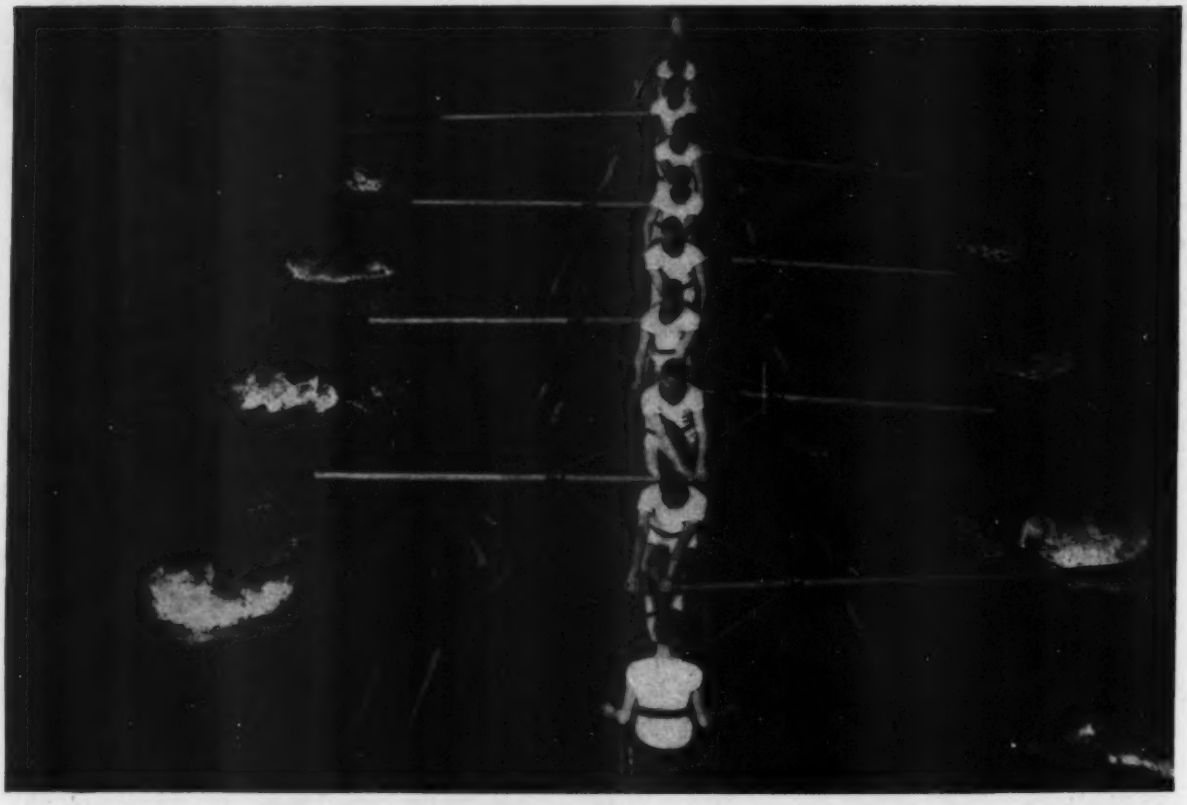
The kaolins were divided into four groups: (1) those pure white products that had highly desirable paper-technological properties; (2) those which have good technical properties, but a lower degree of whiteness; (3) those with lower technological properties, and whiteness; (4) those with very definitely poor technical properties and/or whiteness. Class (1) is required only for special papers, and the authors suggest that more extensive use be made of the lower grades, which impart to the paper a faint yellow tone, since most German kaolins are off-color. However, according to the investigators, this is of little moment to the reader after he has accustomed himself to this color. Very detailed descriptions are given for measuring particle size according to the methods of Casagrande (Die aräometer Methode z. Bestimmung der Kornverteilung von Böden u. anderer Mineralien. Berlin; Verlag Springer), and Petersen (Sprechsaal, 1935, No. 27,423). The results in terms of microns are represented graphically in the accompanying illustration, where the percentage composition is plotted against the particle size. (The numbers given on the face of the graph, on following page, refer to specific kaolins.)

Technological properties were determined by making test sheets under care-

◆ Influence of Density of Pulpwoods on Pulp Yield and Properties

In general, for the same degree of pulping, the denser woods (weight for weight) give higher pulp yields in the sulphite digestion. For example, 46 samples of woods, ranging in specific gravity from about 0.29 to 0.4, gave a mean pulp yield of 50.7 per cent (recalculated using the Sieber No. of 40). The same number of samples, ranging in density from 0.44 to 0.59 gave a mean pulp yield of 53.4 per cent. The rate of delignification is not impeded, but rather accelerated when woods of higher density are used. Pulp from the denser woods shows a lower strength (tearing length, bursting strength, tear and double folding endurance) prior to the beating than after a certain point is reached in the later stages of beating. The properties of such pulp are generally preferable to those of pulps derived from lighter woods. Nevertheless, woods of low density are suitable raw materials for pulping, and the strength of such pulps is usually adequate. Pulp woods having similar densities, but grown in different regions may be subjected to the same chemical treatment, without giving very different results. The width of the annular rings, and the summerwood portions of the (spruce) pulpwoods, examined above, were studied as a corollary to the previous investigation, at the Technical School at Munich. The woods of very low density have very wide annual rings, whose width is however subject to wide variation. The mean width for 15 year old trees, was about 7 mm.; while over 75 per cent of all the ring widths measured in the various woods of light density lay between 3.0 and 6.8, and the mean annular ring width may be taken as 5.6. With these light woods the structure of the wood is quite uniform. Very dense woods have exceedingly narrow annular rings, the variation being slight, with the mean value approaching 1 mm. Woods of intermediate density were also examined, and here the annual rings show little regularity in width, the variations lying between 0.6 and 4.1 mm. Woods of low density contain only about 8 per cent summerwood, and variations from this figure are not noteworthy. On the other hand very dense wood contains 7-40 per cent summerwood, with a mean of about 20 per cent. Woods of intermediate density have summerwood contents varying very widely, and resemble the heaviest pulp woods in this respect. It is, therefore, essential to study the width of annual rings in conjunction with the percentage of summerwood. The research was made with wood taken from different parts of the bole, from spruce grown on various sites, and under varying ecological conditions. Figure 1 shows a typical series of dense spruce discs examined. Figure 2 shows light pulpwood, and Figure 3 shows a pulpwood of intermediate density. Full tabulated data give the origin of the wood, density, summerwood content, and number of rings. Rudolf Sieber. Papier-Fabr. 50 (Tech Teil) 478-84 (1936), and Reinhard Trendelenburg. Ibid. 484-90 (1936).





PARTNERS IN PROGRESS

Menasha is proud, indeed, to be a partner in the paper industry; is glad to place its facilities and services at the command of its jobbers, its dealers, its associate manufacturers; is always prepared to "line up" as one of the many constructive forces that contribute to the growth of this aspiring young industry.

Menasha believes that genuine progress is founded on a kindred understanding of the industry's needs and problems, not in the light of "one company as one company" but as part of a soundly integrated system . . . the paper industry; a great industry that owes its promotion, in large measure, to the unselfish spirit of working together, the spirit that makes men and their devices partners in progress!

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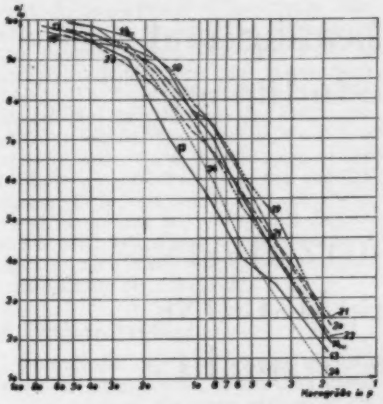
fully controlled conditions. Preliminary experiments were made to indicate the reproducibility of kaolin retention with beating conditions, the effect of standing on beaten loaded stock, the reproducibility of kaolin content in sheet formation in the Rapid-Köthen machine, the influence of thinning stock on the retention of the filler, the best method of sampling stock after beating, and the most effective method of adding kaolin to the beaten pulp. As a result, the technique involved sheets formed from 100 parts high grade bleached sulphite beaten to 40 deg. S.R. and treated with 60 and 30 parts respectively of the kaolin sample and the same pulp, beaten to 70 deg. S.R. and treated similarly with the same respective amounts of filler. The size consists of 2 per cent rosin and 3 per cent alum, and the pH of water drainings from the sheet machine was 5.



Careful studies were then made on the finished sheet. These included ash content, determination of smoothness, the determination of scratching particles that affect the plates in printing, transparency and whiteness. Scratching was measured by the Bekk-Ullstein technique in which a test sheet of definite length is drawn between a fixed microscope slide and a highly polished steel drum, the pressure of which causes protruding sharp particles of kaolin to leave fine etched lines, which are best counted with a hand lens after projection of a definite area (of scratched glass) on the ground glass plate used in photomicrography. Attempts to make photomicrographs were not entirely successful (although the authors have reproduced over 30 of them). In all of these sheets, the pulps were beaten to 70 deg. S.R., the screen side of sheet was tested and the ash content in all cases was very nearly identical. Other methods of investigation were given with great thoroughness and in detail, and the article serves to show the determined effort Germany is making to utilize her domestic raw materials. Bruno v. Possanner, A. Laubenheimer, R. Wagner and R. Jenke. Papier-Fabrikant (Tagungsheft). 34, No. 50, (Tech. TP.) 459-77 (1936).

◆ Lightfastness in Colored Papers

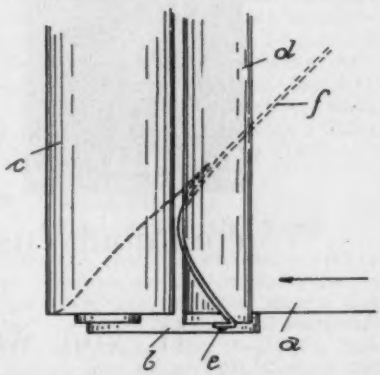
The method suggested by the Society of Dyers and Colourists is unreliable. No suitable inexpensive lamp reproducing daylight was found for comparing standard (unirradiated) samples with exposed samples. Grant's method, which involves the measurement of lightfastness by determining the decrease in fluorescence, has not as yet warranted adoption. Two other methods, which are still experimental, involve the following technique: (1) the paper is dyed with lightfast colors (especially the Chlorantin dyes) varying from 0.05 to 2.0 per cent, and is then exposed to direct sunlight for definite time periods (12 to 36 hours), followed by comparison with unirradiated, standard samples. (2) Bleached sulphite pulp is beaten to 30–40 deg. S. R., colored with 1.0 per cent, or sometimes 0.5 per cent or 0.25 per cent of various chlorazol colors, and then treated with 0.5–5.0 per cent hexadecylpyridinium bromide, a chemical that renders these colors much more sensitive to light (i. e. thus decreasing the lightfastness of the colored sheet). The treated sheets, after exposure to direct sunlight for 6 to 96 hours are then compared with colored sheets, similarly prepared and exposed, but in which the hexadecylpyridinium bromide is lacking. Neither of the foregoing methods is as satisfactory as the following, which involves a new technique. The light intensity falling upon the irradiated paper is measured by an actinometric paper, specifications of which are given. The standard colored paper sample that remains unexposed is covered with a wedge-shaped slide transmitting light in various amounts. This slide when laid on the standard colored sheet, simulates the effects of graded bleaching, and the device thus serves as a comparator. Experiments are still in progress for obtaining a suitable slide. When this, the most promising of all methods used to date, was employed, the best results were obtained with a rag paper, sized with 2 per cent alum and 4 per cent rosin. The dyestuff recommended is Rhodamin 3R. The author includes a comprehensive discussion of the difficulties involved in all means of gauging lightfastness—for example, papers colored with mixtures of fugitive and permanent dyes. H. Ainsworth Harrison. Papier-Fabr. 34 (Tech. Teil.) 321-6, 329-33 (1936).

◆ Quantitative Determination of Lignin

One of the difficulties of the lignin determination by the use of 65-66 per cent sulphuric acid (and a time period not exceeding 24 hours) seems to have been overcome. The H_2SO_4 residue retained in the lignin even after protracted washing (which hitherto has been up to 6 per cent) can be removed by the following modification in procedure:—a 1 to 1.3 gram sample of rasped wood is finely divided, extracted with ether, dried at 100 deg. C. and heated with 50 cc. of 65-66 per cent sulphuric acid. After gelatinization, the mixture is allowed to stand at room temperature, with occasional stirring, then diluted with water and filtered through an alundum crucible. Washing is continued until the wash waters are nearly free from acid. The crucible is then placed in a weighing bottle provided with a ground-in glass stopper and treated with 50 cc. of tenth-normal hydrochloric acid. The bottle is then stoppered and placed in a steam-heated drying oven for 12 hours. Thereupon the crucible is removed, placed back on the suction apparatus, and the washing is repeated. It was found that all the residual acid could then be washed out very easily. The crucible is dried at 75 deg. and finally for 0.5 hour at 100 deg. C., cooled and weighed. The average lignin content of spruce wood was shown to be 28 per cent. P. Klason: Svensk. Kem. Tids. 47, 298 (1935); through Papierfabr. Fest und Auslandsheft (June, 1936). Abstracts p. 132.

◆ Transfer of Paper Webs

The patent claims to solve the problem of the transference of a running paper web from one shell to another on drum winders of paper machines. In the figure the running paper sheet is (a); (b) is the winding drum, while (c) indicates the reel that is to be substituted by another reel (d), carrying (e), which is a pin, bolt, or similar device, on the front side. To this device (e) is attached a string (f), in such a way that it crosses beneath (a) as it arrives. The other end of (f) is laid loosely over



a bar. Thus (f) winds itself spirally around (d) and also cuts the paper-web continuously and permits its uninterrupted transfer from (c) to (d). Zellstoff-fabrik Waldhof/werk Cosel. Cosel-Oderhafen and Paul Heintsch. German Patent 634174, Class 55c.

◆ Diffusion of Sulphite Liquor Into Wood

This is the 33rd paper on the sulphite digestion published from Hägglund's laboratory. One cause for the great decrease in pulp strength which sets in when wood in finely divided form is used in the sulphite process (i. e., when the wood is no longer in chip form), is the high intensity of acidity of the

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liquor. The average cooking liquor has pH of about 2.3. However, in the wood chip, the fibers are still held together, and largely protected from the action due to this high acidity. It was shown that the acidity within the cell walls (of the chips) was lower by far than in the acid liquor which has not penetrated into the wood, and in the actual cooking conditions the pH is probably 3-4. Furthermore, the calcium ion concentration of the penetrated liquor is lower than that in the outer liquor. Lignin extraction from the wood is undoubtedly a monomolecular reaction in normal sulphite cooks (i. e., the rate of reaction at any particular moment of the cook is proportional to the lignin then present in the wood). The diffusion of the cooking liquor into the wood is largely dependent on the speed with which the liquor penetrates into the transverse direction of the chip, and also on whether or not the wood has occluded air. Both the diffusion of the acid liquor into the wood, and the diffusion of lignosulphonic acid out of the wood structure, are of marked importance. E. Hägglund Svensk Pappers-tidn. 39, 95 (1936), through Papierfabr. (abstracts), 34, 229 (1936).

◆ Lignin Problems

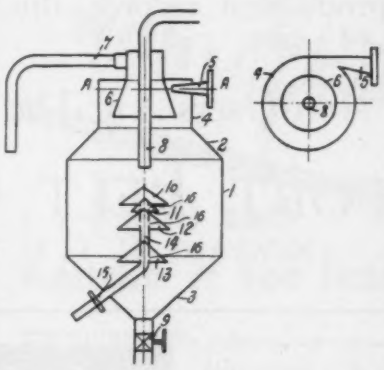
Stimulated by the much-discussed work of Hilpert, the author has given one of the most thorough reviews of experimental work (especially that carried out in Germany) published within the past few years. There are 67 citations from the literature. The data are not new, although many of them are recent, and the author has utilized them in making a careful analysis of Hilpert's working hypothesis that lignin is actually of carbohydrate origin. The author's conclusions are the following: (1) from investigation on straw, it is highly probable that the actual lignin content is much lower than has been assumed hitherto; (2) this is probable also in the case of beechwood lignin; (3) the assumption that no lignin (containing cyclic nuclei) pre-exists in straw, is not supported by the experimental facts; (4) there is no evidence that sugars exist which are more sensitive to sulphuric acid than are fructose or xylose; (5) this lack of evidence also extends to the methylated sugars. There is no doubt, then, that the thoroughgoing investigations of the past decade have established the existence of lignin in wood, and that this lignin contains cyclic (especially aromatic) groups. Carl G. Schwalbe. Cellulosechemie 17, No. 11-12, 113-23 (1936).

◆ New Lignin Reagent

The author uses 2,6-diaminopyridine in a solution of 18-36 per cent HCl in testing for lignin in various plant tissues or groundwood. In the cold, a blood red coloration results when lignin is present. Other amino and diaminopyridines give only yellowish colors. Only on heating does the 2,6-diaminopyridine give red colors with arabinose and glucose. The suggestion is made that the new reagent be used in testing for delignification. O.v.Schiekh. Z.Angew.Chem., 49, 362 (1936).

◆ Continuous Purification and Sorting of Pulp

The mechanism consists of a cylindrical metal container (1) with conical parts (2) and (3) and an upper cylindrical portion (4), above which is the tangential inlet (5) for the paper stock. This is best shown in the illustration below. Built within (4) is the cone (6) which is connected with the pipe-line (7) which carries off the liquid with the lighter impurities. Below the discharge pipe (8) which is placed axially within (1) are a number of hollow cones (10), (11), (12), and (13) following in series, each open below. These are connected with the suction pipe (14), that is provided with the valve (15), and also with the openings (16), so placed that they fall within the hollow cones. The paper stock enters (5) at a very high velocity and is whirled into (4) as the result of the tangential arrangement of (5). Through centrifugal force the heavier particles strike walls (2) and (1), and after sinking are removed by the pipe line (9). The particles of lower specific gravity are drawn off continuously from cone (6), through pipe line (7). Purified stock is withdrawn through the centrally placed pipe (8) to be worked up further. André Bergès (France). German Patent 636,729. Class 55-d.



◆ Scots Pine in Sulphite Pulping

These investigations confirm earlier studies. A definite portion of the resins found in pine determine the fitness of this wood as raw material for sulphite pulp manufacture. It was shown again that after ether extraction of the wood, that portion which was then soluble in acetone actually inhibited delignification. In other words the amount of total resin is not an essential factor. It is the type of resin which determines whether or not wood may be used satisfactorily. None of the pine resins have an appreciable influence on the absorption of sulphite liquor, or on the formation of lignosulphonates. However the ether soluble portions of the resins extracted by acetone certainly prevent the removal of the lignosulphonates from the chip. These resins seem to form semipermeable membranes, which do not interfere with the diffusion of the sulphite liquor into the wood, but which prevent the removal of the large lignosulphonic acid molecules. Orientating experiments on the chemical nature of these acetone resins, indicate that they contain methoxyl groups and show the characteristics of the lactones. E. Hägglund, J. Holmberg, and T. Johnson. Svensk Pappers-Tidn. 39 (Special No.) 37, (1936) through Papier-Fabr. 34 (Abstracts) 286.

◆ Differentiation Between Bleached and Unbleached Wood Pulp

This is a modification of Klemm's method. The disintegrated paper is heated for 1-2 minutes in a saturated solution of malachite green in 2 per cent acetic acid. After being washed thoroughly with water, the fibers are stained further on the microscope slide with chlorozinc-iodide solution. Thereupon unbleached and mechanical pulps are colored green, whereas bleached wood pulp is colored blue. The fibers may then be very clearly and sharply differentiated under the microscope, and can be counted with high precision. In another sample, the paper fibers are colored with chlorozinc-iodide alone, so as to differentiate between chemical and mechanical pulp. Differences in coloration which also lead to the ready counting of fibers were obtained when the macerated sample was treated first with malachite green, then with iodine in KI solution, and finally with chlorozinc-iodide. Here unbleached chemical pulp and mechanical pulp appear yellowish-green, while bleached pulp is clear blue. Oskar Singer. Papierfabr. 35, 23-4 (1937).

◆ Ground Shales as Fillers in Wrapping Paper

German ground shales have proved to be effective as loading materials in pasteboard and wrapping papers, and the Deutsche Forschungs-gesellschaft für Gewinnung und Veredlung von Steinen und Erden (The German Research Association for the Production and Improvement of Rocks and Clays) report that these are at least as satisfactory as the ground shales imported from France and Belgium. M. K.: Wochbl. Papierfabr. 67, 596 (1936).

◆ Carbon Dioxide Formed in the Sulphite Cook

Invert sugars, pentosans, starch, purified cotton cellulose, and lignin (obtained by the Scholler process) were all subjected to a sulphite digestion. This was carried out so that the digester was evacuated initially and the cook started at a 15 mm. vacuum. The cooking liquor contained 5.28 per cent total SO_2 and 1.04 per cent CaO, and the

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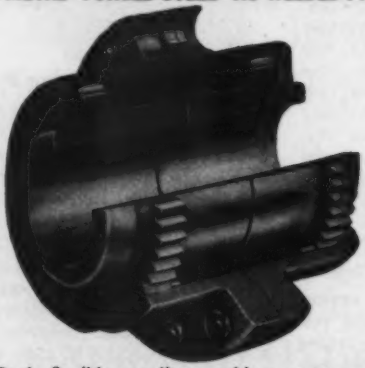

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period of digestion was 10.4 hours. Results indicate that carbon dioxide may be traced to the hemicelluloses, and certain hexosans and pentosans in the wood, and that it is a product of decomposition of sugars formed in the cook. On the other hand, neither cellulose nor lignin are responsible for the carbon dioxide. When spruce was subjected to ordinary sulphite cooks with liquors both rich and poor in lime, that which contained the higher lime content gave 50 per cent more CO_2 than did the other. This supports the hypothesis that sugar degradation leads to carbon dioxide formation. O.Routala and A.Parpola. Acta Chem. Fennica, 9B,18 (1936 through Papier-Fabr. (Abstracts) 34,291 (1936).

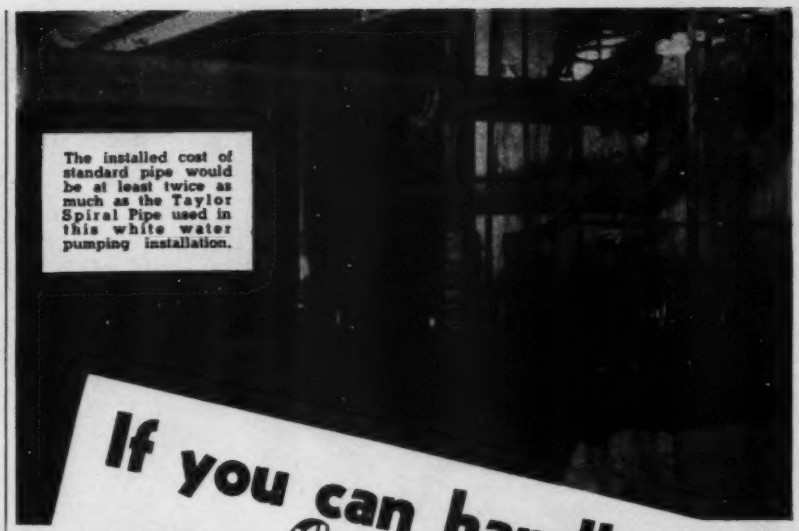
◆ ◆

◆ Training the Electrician's Helper

There has always been a shortage of first-class electricians in industrial work. The policy of a majority of the plants has been rather indefinite as regards the training of their unskilled hands working as helpers to wiremen. Under present conditions it would appear that a more definite policy along educational lines would be a good plan purely from a business standpoint. When a young man who has been driving a team or following some such occupation joins the "gang" he is usually left to his own fate as to whether he absorbs enough knowledge from his companions to reach finally a stage where he is competent to handle a job on his own responsibility. It is not unusual to find that he is discouraged or rebuffed if he attempts to find out the why and wherefore. Journeymen are sometimes prone to think that any knowledge they have is their own personal property, forgetting that they acquired most of the information they possess through association with their fellow workers. Some plan whereby these beginners could be helped along by schools of instruction during working hours and encouraged to take an interest in their work may prove a solution of the replacement problem, which will become more acute in the next few years.

◆ Economy Demands Feed Water Heating

Importance of the savings to be affected through feed water heating has become universally recognized in the power plant field although there are even yet many plants which do not take full advantage of such economies. Decrease in the fuel required for generating steam, increase in the steaming capacity of boilers, less severe contraction strains in the boiler and increase in over-all efficiency of the plant are points which have been reiterated time after time in order to bring out more strongly the advantages to be gained through the use of such equipment. It is usually stated that there is a gain in fuel efficiency of 1 per cent for every 10 deg. Fahr. that the feed water is heated.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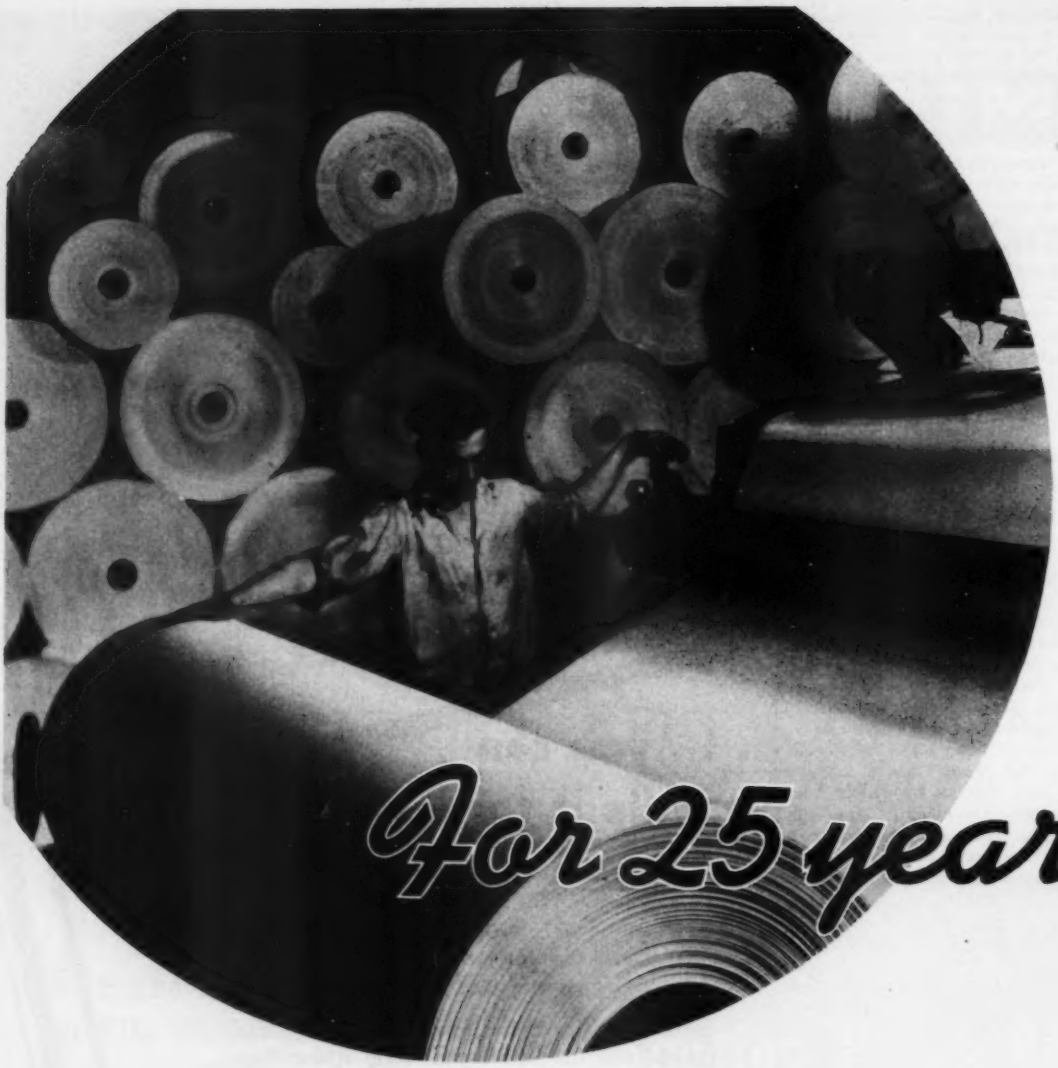

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Compiled by James Atkins, Registered Patent Attorney

20,217—**Production of Pulp.** Thomas Leonidas Dunbar, Watertown, N. Y., assignor to Chemipulp Process, Incorporated, Watertown, N. Y., a corporation of New York. No Drawing. Original No. 1,901,706, dated March 14, 1933, Serial No. 605,696, April 16, 1932. Application for reissue January 29, 1935, Serial No. 3,983. 19 Claims. (Cl. 92—11.) A process for the production of pulp which comprises soaking fibrous material in heated bisulphite liquor under a pressure of approximately 50 pounds until the extractives are substantially removed therefrom and the liquor has penetrated the chips, draining the bisulphite liquor from the fibrous material and mingling said liquor with fresh liquor for reuse, digesting the fibrous material under heat and pressure in bisulphite liquor until the lignin is substantially removed therefrom, withdrawing bisulphite liquor from the material and mingling it with fresh liquor for reuse, and cooking the fibrous material in alkaline liquor until the incrustants of the cellulose are substantially removed.

2,061,332—**Process for Production of Calcium Hypochlorite Bleach Liquor Suitable for Bleaching of Paper Pulp.** John D. Rue, Niagara Falls, N. Y., assignor to Hooker Electrochemical Company, New York, N. Y., a corporation of New York. Application August 27, 1935. Serial No. 38,084. 8 Claims. (Cl. 23—86). The process for production, by chlorination of milk of lime, of calcium hypochlorite bleach liquor suitable, in unclarified condition for bleaching of paper which comprises passing the unchlorinated milk of lime through a screen of the fineness of approximately 100 to 200 wires per inch, whereby the particles of matter normally found therein which cannot be tolerated in paper are removed, chlorinating the screened milk of lime thus prepared until substantially all the lime thereof is converted to calcium chloride and calcium hypochlorite and then adding additional unchlorinated screened milk of lime in amount sufficient to ensure a pH greater than 8.

2,061,632—**Safety Paper and the Like.** Samuel Lenher, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware. No Drawing. Application July 22, 1932. Serial No. 624,053. 38 Claims. (Cl. 91—67.95.) Paper and the like having incorporated therein a 1-amino-5-chloro-benzo-thiazole. 15. The method of rendering paper and the like sensitive to ink eradicating chemicals which comprises incorporating therein a 1-amino-arylthiazole in which the amino nitrogen is directly bonded to the carbon of the thiazole ring and has at least one free amino hydrogen.

2,061,662—**Pulp Refining Apparatus.** William V. Knoll, Dayton, Ohio, assignor to Midwest-Fulton Machine Company, Dayton, Ohio. Application March 14, 1935. Serial No. 11,093. 3 Claims. (Cl. 92—20.) The method of refining pulp in a beater engine having a rotatable bladed roll and a stationary bladed bedplate, which comprises raising a stream of said pulp to a velocity substantially as high as the peripheral speed of said roll then directing it against said roll substantially tangential thereto and at the edge of said bedplate.

2,061,748—**Production of Coated Creped Paper.** Edward H. Angier, Framingham, Mass., assignor to Edward H. Angier, Framingham, Mass., as trustee under Agreement and Declaration of Trust, designated as Angier Laboratories. Application January 20, 1934. Serial No. 707,498. 2 Claims. (Cl. 154—33.) The method of producing a rubber coated creped paper which comprises distributing finely divided rubber with vulcanizing agent in the form of an aqueous suspension over the surface of the paper as it is advanced to a creping doctor, withdrawing at least a portion of the vehicle into the paper whereby partially to deposit the rubber and at least in part condition the paper for the creping operation, creping the paper by the action of the doctor while the rubber is distributed substantially evenly over the surface thereof and thereafter drying the crepe paper and vulcanizing the rubber.

2,061,844—**Blotting Paper Stock Advertising Card and Process of Forming Same.** Chauncey Kenneth Miller, Indianapolis, Ind. Application June 20, 1935. Serial No. 27,494. 13 Claims. (Cl. 92—68.) The process of transforming blotting paper to blotter and card formation, comprising the compression of a selected portion of the paper and the sealing the surface thereof to transform the surface of selected compressed portion to non-blotting character.

2,061,935—**Manufacture of Cellulose Pulp.** Pierre Delcroix, Voiron, France, assignor to Papeteries Navarre, Lyon, France, a limited liability company. No Drawing. Application December 15, 1932. Serial No. 647,414. In France April 22, 1932. 5 Claims. (Cl. 92—21.) In a process of manufacturing unbeaten and unrefined cellulose pulp wherein the same is reduced to non-fluid form on a pulp machine, the step of applying a small quantity of melted paraffin to the drying sheet of unbeaten and unrefined fibres as the said sheet passes through the pulp machine.

2,062,228—**Paper Machinery.** Albert H. Standley, Downington, Pa., assignor to Downington Manufacturing Company, Downington, Pa., a corporation of Pennsylvania. Application October 19, 1934. Serial No. 749,126. 5 Claims. (Cl. 92—49.) Paper-making apparatus, including a traveling endless felt supporting on its operative travel and upon one face thereof a paper web in the process of formation, and a light suction roll directly engaging and exerting suction action on said face of the felt during the return inoperative travel of the felt, said roll comprising a light perforated shell supported on anti-friction bearings and driven at the same speed as, and only by the travel of the felt thereabout, said roll being of a width equal to the width of the felt and being held against movement transversely of the felt, the engagement of the felt with the roll being through the pull of the felt alone.

2,062,445—**Apparatus for the Manufacture of Paper.** Edgar Alexander Charlton, New York, N. Y., assignor to International Paper Company, New York, N. Y., a corporation of New York. Application December 17, 1934. Serial No. 757,766. 15 Claims. (Cl. 92—39.) In an apparatus of the class described, a paper making screen, a breast roll and couch roll around which said screen is trained, a stock vat, a rotatably mounted suction cylinder in said vat and around which said screen is passed during its travel from couch to the breast roll whereby a layer of stock is deposited on said screen as it passes through said vat, and means to deposit a layer of stock on the layer initially formed during the travel of the screen between the breast and couch rolls.

2,062,922—**Paper Machine Control.** Guido Wünsch, Berlin-Steglitz, Germany, assignor to Askania-Werke A. G. vormals Central Werkstatt Dessau und Carl Bamberg-Friedenau, a German company. Application February 19, 1934. Serial No. 712,090. In Germany February 25, 1933. 9 Claims. (Cl. 34—48.) That method of governing the temperature or other controllable condition of a web of paper or fabric passing through a drying machine which is characterized by continuously measuring the condition of the web to set up a controlling force always proportional to changes in the condition; creating separate governing forces, one of which is directly responsive to

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changes in said condition and the other of which is responsive to the algebraic sum of any condition change and the rate of change; applying the first named governing force to regulate the supply of steam to the machine proportionately to the rate of flow; and applying the second named governing force to vary the ratio between the steam flow and the force representing said condition whereby to maintain the condition substantially constant. Control mechanism for a paper drying machine comprising, in combination, a resistance thermometer connected to measure the temperature of the moving paper web and create controlling electrical impulses which are proportional to the temperature changes; master governing means including a galvanometer and a combined pneumatic device controlled by the electrical impulses to create separate pneumatic governing forces in the form of pneumatic impulses, one force being directly responsive to temperature changes and the other force being responsive to the sum of the temperature change and the rate of temperature change; a steam flow regulator connected to be operated by the first named governing force and thereby vary the steam supply to the machine in proportion to deviations in temperature from a set value; and a second regulator operated by said second governing force and connected to readjust the steam flow regulator in accordance with the total of temperature change and the rate of temperature change.

2,063,367—Extracting Method and Apparatus. Joaquin Julio de la Roza, Sr., Great Neck, N. Y., assignor to de la Roza Corporation, Wilmington, Del., a corporation of Delaware. Application October 24, 1934. Serial No. 749,741. 12 Claims. (Cl. 92—7.) In the digestion of cellulose bearing materials under heat and pressure in which chemical is used for the digesting process, the method of continuously extracting the chemical from the digested material including the steps of pressing the hot digested material before the digesting pressure is released, removing the chemical expressed from the compressed material, adding a fluid to the pressed material and again pressing the material to express a substantial portion of the fluid contained therein.

2,063,887 — Apparatus for Treating Paper. Russell S. Bracewell, South Hadley, Mass. Application June 12, 1933. Serial No. 675,352. 6 Claims. (Cl. 91—44.) A device for coating a web of paper, or the like, which comprises a casing open at the top, a cylinder rotatably mounted in the casing adjacent the open top, a reservoir for coating material positioned at the bottom of the casing, a roll positioned in the casing to take up coating material from the reservoir, means positioned intermediate the cylinder and the take-up roll adapted to receive coating material from the take-up roll and rub it onto the surface of the cylinder, and means to rotate the cylinder at a speed sufficient to discharge the material from the surface of the cylinder in a fog-like spray.

2,063,888 — Method for Treating Pyroxylin Coated Paper to Eliminate Curl. Russell S. Bracewell, South Hadley, Mass. Application August 27, 1934. Serial No. 741,681. 4 Claims. (Cl. 91—68.) The method of treating pyroxylin coated paper to lessen the tendency of the same to curl, said paper having been coated on one side only, which consists in first moistening the uncoated side of the paper, then dragging the uncoated and moistened side of the paper over one or more breaker bars and finally drying said uncoated side of the paper.

R2,065,636—Apparatus for Treating or Impregnating Paper. Allen D. Whipple and Cortland W. Davis, Alexandria, Ind., assignors to The Mantle Lamp Company of America, Chicago, Ill., a corporation of Illinois. Application March 4, 1931, Serial No. 520,118. 22 Claims. (Cl. 91—55.) A machine for impregnating and treating sheet material, including means for impregnating a sheet of material with desired polymerizable fluent substance, an oven through which the impregnated sheet may pass, rolls for guiding said sheet as it passes through said oven, and air-supplying means disposed adjacent each roll for cooling said sheet to thereby relieve the uncured substance of its stickiness and prevent it from adhering to said rolls.

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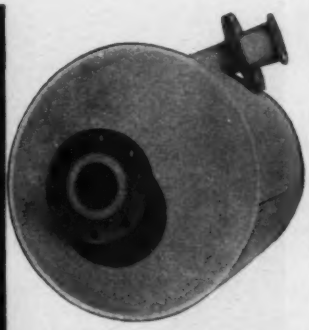

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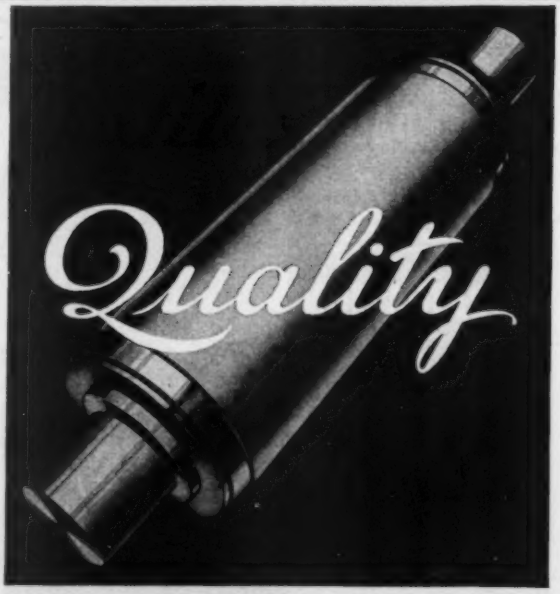

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The COMMERCIAL OUTLOOK

New York, March 1, 1937.

IT WAS almost the undivided report of the scores of paper mill executives who were in New York to attend the annual convention of the American Paper and Pulp Association and affiliated organizations that, notwithstanding the substantial increases in paper and board production and shipments during 1936, and more especially in the closing months of the old year, further gains have been scored thus far in the new year. In short, the improvement is gradually gaining momentum; there is a steady expansion in paper consumption and demand; not by any means, judging from present indications, has the broadening of activity in the paper industry yet reached its limit for the current era of general industrial and trade revival.

Latest issued statistics show that the production ratio of paper mills of the country is 89.2 per cent, at the middle of February. Contrasted with an average basis of 77.9 per cent for the month of February a year ago, and 70.0 per cent in February, 1935, this represents a remarkable increase in productive operation of the industry. Moreover, it bears out the statements of mill officials that production is steadily mounting, since the latest ratio basis is well above the monthly average of 85.9 per cent in December, 88.0 per cent in November and 87.6 per cent in October of last year.

One of the highly significant insights into the situation disclosed at the paper manufacturers' convention is in connection with mill inventories of paper and board. Mill representatives reporting at the annual gathering compared figures of manufacturers' stocks of finished product at the close of the past year with a year before, or at the end of 1935, in relation to unfilled orders, and some rather startling disclosures came to light. In instances, some groups of mills, that is, those producing similar classes of paper or board, were shown to have a far greater tonnage volume of orders on file than they have product in stock, as contrasted to a position a year previously of inventories in frequent cases exceeding unfilled commitments by as much as five or six to one ratio.

This being the case, it is not to be wondered at that many paper and board manufacturers are obliged at present to refuse additional orders. A large majority of mills have all they can attend to filling the wants of regular customers, and, in fact, are falling behind in achieving even this, simply because they are unable to produce all the paper or board which jobbers, converters or consumers are calling for. The industry truly is in a sold-up condition; the position has reversed itself completely where a seller's market rather than a buyer's market prevails, and it is not going too far to state that if demand continues to expand in only the proportion witnessed in recent months, a runaway market situation is definitely likely.

A warning note of this was sounded at the papermakers' convention. Speakers urged caution on the part of paper mill officials, stressing the dangerous threat of raw material shortages and other probable developments which might carry the situation out of hand, to be followed by repercussions reacting unfavorably upon the industry.

Newspaper advertising by retail merchants in 74 major cities for this year through February 13 was 5.6 per cent in excess of the corresponding period of 1936. For the week ended February 13, the volume represented an increase of 6.9 per cent compared with the same week a year ago, according to Advertising Age.

January production of newsprint in the United States and Canada set an all-time high because of the large gain in Canadian output. Production by United States mills during the month was slightly larger than a year ago, but was still well below the high level set during the '20s. Mills in Canada produced 287,691 net tons in January, compared with 227,955 tons in the same 1936 month, an increase of 59,736 tons, or 26.2 per cent. The United States gain of 0.8 per cent from 79,361 tons last year to 80,005 tons this year, plus an increase in Newfoundland, resulted in a total North American output of 395,850 tons in January, a rise of 62,015 tons, or 18.6 per cent, over the production for the similar month of 1936, according to figures reported by the News Print Service Bureau.

Newsprint shipments by Canadian mills amounted to 262,692 tons in January and by United States mills 75,637 tons. Stocks at Canadian mills rose to 49,505 tons, against 24,575 tons a month before and 76,658 tons at the end of January last year. Stocks at United States mills increased to 18,673 tons, compared with 14,328 tons on December 31 last and 14,194 tons at the close of January, 1936, making total stocks at mills in both countries of 68,178 tons at the end of January, against 38,745 tons a month before and 90,852 tons a year ago. Considerable tonnage was accumulated at points from which water shipments will be made later.

Production of paperboard in the United States during the calendar year 1936 registered a gain of 11.1 per cent over the preceding year, and a rise of 28.8 per cent over 1934, according to figures released by the U. S. Census Bureau. A total of 3,658,871 net tons of board of all classes was produced in this country last year, against 3,294,055 tons in 1935, and 2,839,705 tons in 1934. Thus, last year's output of board exceeded the preceding year's total by 364,816 tons, and was 819,166 tons above the 1934 production.

One of the features of the board figures for the year is that production in December was the largest in any month during 1936 with one exception, or October. This was very unusual, as December output in both 1935 and 1934 was the smallest in any month in those years. December, 1936, production amounted to 328,773 tons, contrasted with 321,624 tons in November last, and 243,594 tons in December, 1935. New orders received by manufacturers for board in December last called for a total of 350,452 tons, against 308,732 tons in the month before and 234,753 tons in the same 1935 month. Total orders for 1936 aggregated 3,720,996 tons, which exceeded the year's production of 3,658,871 tons, and compared with a total of 3,281,525 tons ordered during the year 1935. Unfilled orders held by manufacturers at the close of December were for 130,472 tons, contrasted with 127,193 tons a month previously, and 81,894 tons at the end of 1935.

Shipments of prepared roofing from mills in the United States in December last amounted to 1,461,728 squares, a seasonal reduction from the 2,591,991 squares shipped in the preceding month, and comparing with 1,153,615 squares in December, 1935, according to Census Bureau figures. Total shipments for the year 1936 were 32,227,908 squares, recording an increase of 23.7 per cent over the aggregate of 26,050,151 squares in 1935, and a rise of 32.8 per cent compared with 24,005,001 squares in 1934.

◆ ◆

◆ THE EXPORT OF wood pulp, paper, and cardboard from Sweden accounted for approximately 30 per cent of that country's total 1936 export. Its export of these products alone increased 35,000,000 kronor last year to the total of 444,000,000 kronor. Sweden's total export of 1936 was 1,515,000,000 kronor.

◆ THE EDGEWATER BEACH HOTEL, Chicago, has been selected as the meeting place for the 1937 conference of the National Industrial Advertisers Association on September 23, 24, and 25, according to Wm. E. McFee, president and chief copywriter for the American Rolling Mill Company, Middletown, Ohio.

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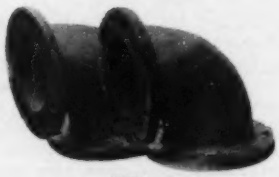

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Domestic RAW MATERIALS

◆ Papermaking Rags

It is something of an axiom in the paper mill supplies trade that as the spring draws on, prices of rag stock—or at least some grades of rags used for papermaking—tend to ease as demand slows down and incoming supplies increase in conjunction with the spring house-cleaning period. Thus, there are indications of a rather softer undertone in some corners of the papermaking rag market at present, although on the whole it must be said prices not only are holding firmly but continue to exhibit a strengthening trend.

The chief easiness—if it can be correctly described as such—appears in the lowest quality class of papermaking rags, or roofing grades. It is evident that roofing felt manufacturers, or a good many of them, have let down in their purchasing, and with demand less voluminous and decidedly less keen, dealers are put on the defensive and display more of an inclination to book mill orders at slight recessions in price. On the other hand, there is pronounced firmness in prices of new cotton and linen cuttings of practically every description, and foreign rags of about all grades are quotably strong with importers frequently naming prices which are so well above a parity with domestic corresponding grades that consuming buyers are passing up the rags offered.

There are ample signs that roofing paper manufacturers, probably fearing the worst as regards available rag supplies, have accumulated sizeable inventories of rags, and therefore are well enabled to retrench in buying for a time. Nevertheless roofing mills are using rags on an extensive scale, and the question arises, how long can they afford to keep out of the market as buyers. Dealers contend that the exceptionally open winter in most parts of the country means rags, and more especially low grades for roofing mills, have been gathered with little or no interruption in recent months, and for this reason the usual gain in spring supplies probably will not materialize this year. Consequently, there is a great deal of confidence expressed concerning the roofing rag situation even though temporarily consuming demand has subsided fairly sharply.

New cuttings are moving freely both to domestic fine paper mills and for export. Foreign demand is serving to run prices upward on some grades, notably No. 1 new white shirt cuttings, current quotations on which range around 9.50 cents a pound delivered paper mills, with sales abroad reported netting dealers 8.75 cents to perhaps slightly higher f.a.s. at New York. Unbleached muslins are firm and in good demand at 9.75 to 10 cents a pound f.o.b. dealers' shipping points, as are new light silesias at 6.75 cents, new blue overall and cheviots cuttings at 7.50 to 7.75 cents, new canvas cuttings at 9.50 cents, fancy shirt cuttings at 3.75 to 4 cents, No. 1 washables at 3 cents, bleached canton flannels at 9 cents and light flannelettes at 7.50 cents. New white linen cuttings are quoted at 11.50 cents a pound at dealers' points, and grey linen at 11 cents.

In the East, domestic roofing rags are priced at 2.15 cents or higher per pound for No. 1 classification stock, and 1.95 to 2 cents for No. 2 roofing. Imported roofing rags are at least 2.75 cents for linsey garments and 2.35 cents for dark-colored cottons, ex dock New York, and often quoted above these figures. Old white and blue cottons are in fair routine demand, and quotably maintained at 3.75 to 4 cents per pound for No. 1 repacked whites, 2.50 cents for repacked twos and blues and 2.25 cents for repacked thirds and blues.

◆ Old Paper

Reflecting the active position of paperboard mills, old paper is in excellent demand and strong in price. Changes over the last month have been upward, practically without exception. Board manufacturers, as well as other consumers, are absorbing supplies on an extensive scale, and the market in all the important accumulation centers of the country is being kept clear of stock, demand being sufficient to readily take up the material offered. Prices constituting real premiums are asked and paid for certain specialty grades which are in limited available supply. For example, new kraft envelope cuttings are reported to have sold at 2.75 cents a pound, if not higher, at shipping points; extra quality packing of white ledgers at 1.90 to 2 cents per pound, and No. 1 hard white envelope cuttings at 3.10 cents. Old kraft paper is firm at 1.50 cents at dealers' points, No. 1 hard white shavings are bringing 2.50 to 2.75 cents a pound, No. 1 soft white shavings 2.15 to 2.25 cents and up to 2.50 cents for one-cut grade, colored ledgers 1.50 cents, and No. 1 heavy books and magazines 1.25 cents.

Old corrugated boxes, a particularly active item, are selling at 75 to 80 cents per hundred pounds in the East f.o.b. shipping points, and at 70 cents in the Middle West. No. 1 mixed paper is 50 cents a hundred in the East, and folded newspapers 65 to 70 cents.

◆ Rope and Bagging

Dealers and importers stress the great difficulty they are encountering in locating old rope supplies, and name stiff prices representing further advancement when asked to quote. The market basis is nominally 3.50 cents per pound f.o.b. shipping points for No. 1 domestic old manila rope, but few or no sellers are now satisfied to accept this price, usually asking a quarter to a half cent per pound more. It is said importers themselves have paid well in excess of 3.50 cents when buying old manila rope abroad. Old strings are in good demand and steady in value. Bagging is firm and tending upward. No. 1 scrap burlap is 2.15 to 2.25 cents a pound at shipping points, No. 1 gunny 2.30 to 2.40 cents, and roofing bagging 1.70 to 1.80 cents.

◆ Pulpwood

Pulpwood prices are pointed higher, and there is a very limited supply offered in the open market. The feeling prevails within the trade that substantially higher pulpwood values will be seen, and there is consequently little disposition to sell at present.

◆ Mechanical Pulp

It is quite apparent that the sharply advancing market on foreign groundwood of Scandinavian origin is having a strengthening influence on domestic and Canadian mechanical pulp prices. At best, the market is remarkably bare of available groundwood. Domestic producers have practically none to offer other than to regular contract customers, and Canadian manufacturers in a large majority of cases appear sold up. Domestic prime pulp is about $28 or $29 a ton f.o.b. pulp mills, and Canadian groundwood $26 to $27 ex dock New York or other American Atlantic ports or in the vicinity of $35 delivered consuming points, depending on the freight rate from grinding centers. It is nothing out of the ordinary for sellers to quote $35 and higher on Scandinavian prime dry groundwood for shipment from abroad over the rest of this year, ex dock American Atlantic seaboard. Foreign moist pulp is quoted at only a shade under dry, perhaps a half-dollar to a dollar per ton less.

◆ Chemical Pulp

The important development in domestic chemical wood pulp is the announcement of a rise of $4 per ton in the contract basis on domestic bleached sulphite for the second quarter of 1937 to 2.90 cents per pound ex dock Atlantic seaboard, as contrasted to a price of 2.70 cents for the first quarter. Chemical pulp of every grade is strong quotably, in eager demand and very hard to find available in any production quarter. Manufacturers are sold out and in most cases unable to accommodate additional business. Domestic soda pulp is 2.70 cents delivered paper mills, and domestic kraft pulp nominally 2.50 to 2.75 cents a pound f.o.b. pulp mills.

◆ Chemicals

Papermaking chemicals are quotably firm and in steady demand. Casein continues to sell at 19.50 to 20 cents a pound, for standard and finely ground, respectively. Solid caustic soda is 2.55 to 2.60 cents per pound at works.

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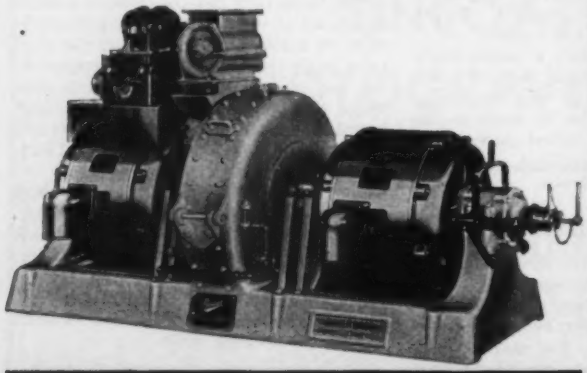

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

Importations of wood pulp into the United States reached a new all-time tonnage high during 1936. Complete figures issued by the U. S. Department of Commerce disclose that a total of 2,277,829 short tons of 2,000 pounds, air dry weight, of all classes of wood pulp —mechanical and chemical— valued at $82,891,000 was imported last year, an increase of 17.8 per cent in quantity and 17.1 per cent in declared value over the aggregate of 1,933,643 short tons of a value of $70,760,951 imported during 1935, which previously was the record amount of pulp ever brought into this country from outside sources in a single twelvemonth. The large rise last year combined with the gain scored in 1935 brought the 1936 total imports 26.1 per cent in volume and 34.0 per cent in value above the 1,806,128 short tons worth $61,850,269 imported during 1934.

Chemical pulp imports in the last calendar year reached 2,050,051 short tons, air dry weight, valued at $78,839,776, and for the first time in the history of the trade exceeded the two-million-ton mark. These receipts during 1936 represented an increase of 306,449 tons, or 17.5 per cent, over the previous record amount of 1,743,602 tons imported in 1935, and a gain of $11,356,210, or 16.8 per cent, in value over the 1935 imports placed at a worth of $67,483,566.

Mechanical pulp importations last year amounted to 227,778 short tons, air dry weight, valued at $4,051,224, comparing with 190,041 short tons of a value of $3,277,385 in 1935, a gain last year of 37,737 tons, or 19.8 per cent, in volume, and $773,839, or 23.6 per cent, in value. In point of total tonnage, last year's receipts of groundwood were the largest in any twelvemonth since 1930, yet were smaller than in any of the eight years prior to 1931, or 1923 to 1930 inclusive. Compared with the record imports of such pulp in any single year, or 331,092 tons in 1925, the 1936 total tonnage was 103,314 tons, or 31.2 per cent, smaller in volume.

As is commonly known in the industry, Sweden is the chief source of wood pulp imported into the United States. Our Government's figures show that imports from that Scandinavian country during 1936 amounted to 1,014,809 short tons of all classes of pulp, valued at $34,199,656, contrasted with 898,875 short tons of a value of $30,200,898 in 1935, and comprising 44.5 per cent of the entire tonnage of wood pulp imported into the United States in 1936.

Imports from Canada last year were 670,962 short tons of a value of $27,099,612, constituting 29.4 per cent of the total volume of importations for the year, and comparing with 532,158 tons of a value of $22,444,200 in 1935. Imports of pulp from Finland during 1936 reached a total of 310,919 short tons of all grades, or 13.6 per cent of the aggregate importations for the year, valued at $10,421,361, as against 266,492 tons valued at $8,890,747 in 1935, while imports from Norway were 125,246 short tons of a value of $5,250,935, against 93,304 tons valued at $3,837,380 in the year preceding, and from Germany, 74,663 short tons of a value of $2,881,857, compared with 80,255 tons of a value of $3,096,673 in 1935. These five countries—Sweden, Canada, Finland, Norway and Germany —aggregately supplied 96.1 per cent of all the wood pulp—mechanical and chemical—imported by the United States during 1936, against 96.5 per cent in 1935.

The imported pulp market continues strong to an extreme. There is very little supply available, of almost any kind of pulp, not alone for spot or near delivery but for shipment during the balance of this year, and even for 1938 at this time for the reason producers in Europe are hesitant to sell for next year. What prices are is largely a matter of guesswork. The price situation is purely nominal, and it is not over-estimating the condition one whit to say that price is absolutely a secondary consideration to many paper and board manufacturers who are eager to secure pulp against urgent requirements.

It is a fact that bleached sulphite of prime quality has been sold on a spot or near-delivery basis in excess of 4 cents per pound, ex dock American Atlantic seaboard, and that prime strong unbleached sulphite has brought 3.05 cents. Prime Scandinavian kraft is nominally 3 cents, or certainly very close to that level, for delivery the rest of this year, while the quotable basis for 1938 is 2.25 cents to higher landed at American Atlantic ports. There seems scant doubt consumers in this country would readily ay 3.75 cents, and more, for any prime bleached sulphite for delivery during the remainder of 1937, and that they would grant 2.90 to 3 cents and perhaps higher for prime unbleached sulphite for similar delivery. Groundwood also has advanced sharply to where $35 per short ton for dry and $34 or more for moist prime European groundwood is demanded for shipment to the United States this year. Dealers or importers, anticipating higher market levels, are said to have themselves paid $35.50 a short ton for dry groundwood for dispatch from sources abroad over the next few months.

◆ Paper Stock

Imports of rags for papermaking into the United States during the calendar year 1936 reached a total value of $4,673,041, showing an appreciable increase over imports valued at $2,411,424 in 1935, according to U. S. Commerce Department figures. Imports of miscellaneous paper stock, embracing old rope, bagging, waste paper, etc., were valued at $1,873,639, against $1,110,652 in 1935. The total value of all paper base stocks, including wood pulp and pulpwood, imported into the United States last year was $98,919,594, as contrasted to $82,043,697 during 1935.

EXPORTS

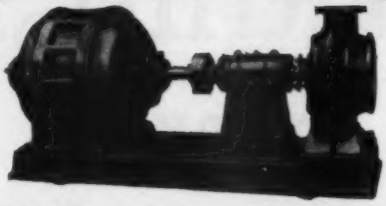
Exports of paper and paper products from the United States during 1936 had an aggregate value of $22,460,542, as compared with $20,519,220 in 1935, according to U. S. Department of Commerce statistics. Losses were registered in shipments of newsprint, book, cover, old and overissue newspapers, bristols and bristol boards and other paper board, wallboard and envelopes last year as compared with the year preceding. All other paper and paper products showed gains sufficient to bring the total value nearly 10 per cent in excess of 1935. Newsprint showed a loss of 35.2 per cent compared with 1935, old and overissue newspaper decreased 17.0 per cent, bristol boards 21.4 per cent, and other paperboards 12.7 per cent.

Exports of paper base stocks in 1936 were valued at a total of $11,984,251, against $9,890,499 for 1935, representing an increase last year of 21.2 per cent.

◆ ◆

◆ THE OLYMPIC FOREST PRODUCTS COMPANY transferred E. T. Kline, assistant manager of the Port Angeles mill, to its Seattle offices. H. A. Sprague succeeded him. J. G. E. Ellis, plant engineer, was transferred to the company's mill at Shelton.

◆ A CHICAGO OFFICE has been opened by Frederick L. Smith, pulp and paper mill engineer of New York City, and Miss Kathleen Carey, daughter of the late James L. Carey, paper mill architect and engineer, is in charge. The office is located at 208 N. Laramie Avenue.



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in a Warren Equipped Plant

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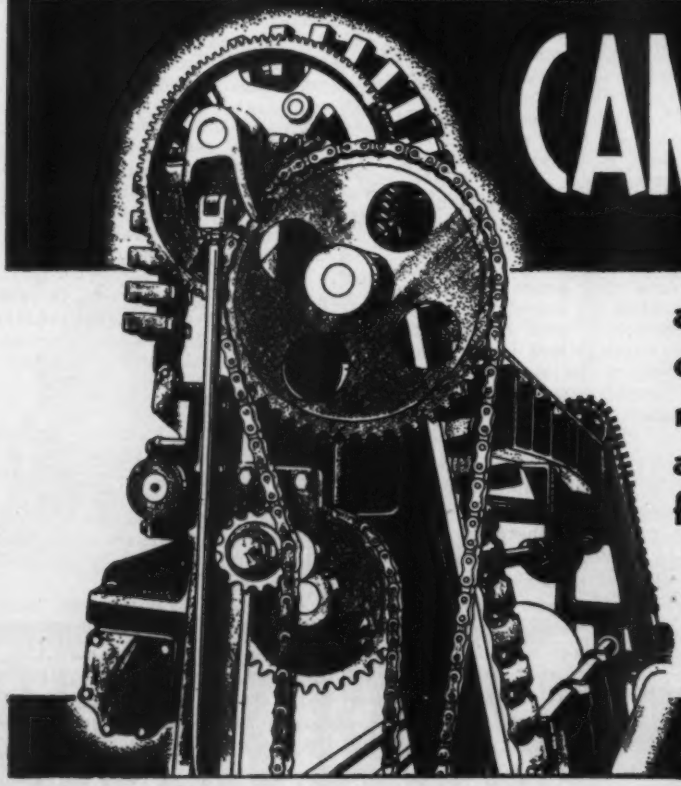

are built as winders in connection with the paper machine or super calender and as rewinders and slitters for finishing room service

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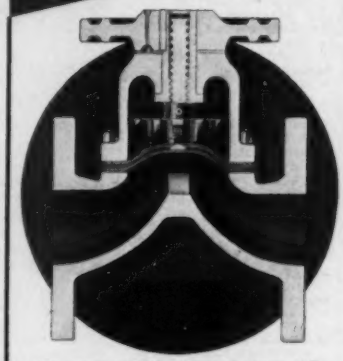

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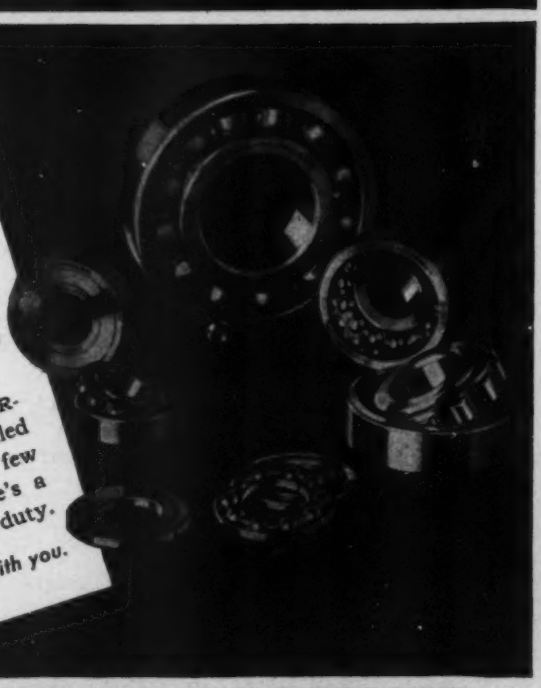

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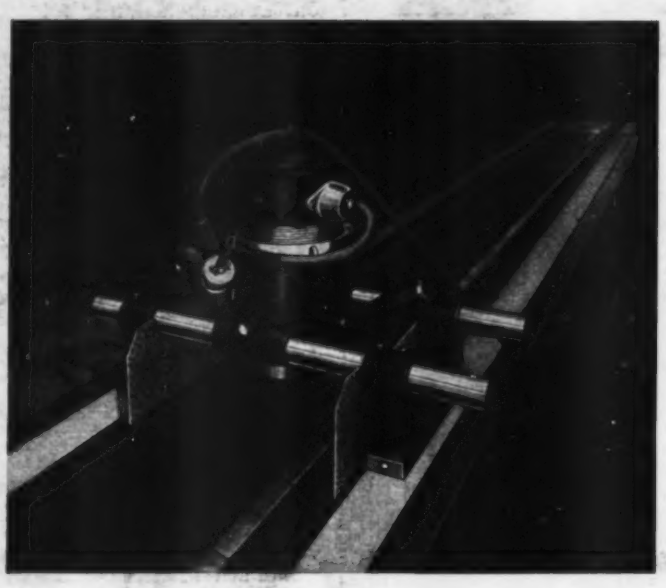

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THE STANLEY WORKS
New Britain, Conn., U. S. A.

MORE TIME

devoted to a planned safety program in your plant will change accident-outgo into divisible dividends... assure a more favorable insurance rate... decrease the "accident-payroll"... and bring lower operating costs.

The ideals of the great industrial leaders of the past are perpetuated by the adaptation and enforcement of modernized safe practices in industrial management... and, the National Safety Council's emblem of Universal Safety is a self-imposed mark of distinction... signifying a human appreciation of worker-value with mutual profit to employer and employee.

WRITE FOR DETAILS

PAPER & PULP SECTION NATIONAL SAFETY COUNCIL
TWENTY NORTH WACKER DRIVE CHICAGO, ILL.